

SPATTER CONTAMINATION IN DENTAL PRACTICES – HOW CAN IT BE PREVENTED?

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SPATTER CONTAMINATION IN DENTAL PRACTICES – HOW CAN IT BE PREVENTED? (Abstract): Infectious diseases endanger all dental personnel during treatment, especially when spatter and aerosols are produced. Therefore, there is a strong need for better infection control principles during all treatments. The purpose of this in-vitro pilot study was to measure the environmental spatter contamination through a fluorescence technique. Scaling was performed using different power-driven devices and high-volume evacuation combined with a newly developed cannula (PS), standard suction cannulas (STS) and saliva ejectors (CDS). **Material and methods:** One sonic (AIR) and two ultrasonic devices (TIG, VEC) were utilized to remove biofilm from 168 artificial teeth in a manikin head. Teeth were scaled for 120s supra- or subgingivally. The spatter contamination of an area of 1.5m² around the manikin head was assessed. **Results and conclusions:** The contaminated area (%) was significantly different for the AIR (median [25th; 75th percentiles]: 2.5 [1.16; 6.05]) versus TIG (0.25 [0.18; 0.88]) and VEC (0.08 [0.06; 0.1]) ($p < 0.001$). Irrespective of the instrument, subgingival scaling led to a less contaminated area (0.18 [0.07; 1.05]) than supra- gingival scaling (0.34 [0.1; 2.24]) ($p < 0.001$). High-volume evacuation combined with STS (0.17 [0.07; 1.04]) and PS (0.18 [0.07; 1.14]) reduced the contamination similarly ($p=0.302$) and was more effective compared to CDS (1.01 [0.12-5.78]) ($p<0.001$; $p=0.002$). Beside the limitation of an in-vitro investigation, it can be conclude that only high-volume evacuation with an adequately calibrated cannula is capable of significantly reducing the amount of spatter contamination produced during power-driven scaling. **Keywords:** SPATTER, CONTAMINATION, DENTAL PRACTICES, SCALERS

A central part of the initial and supportive periodontal therapy (SPT) is the mechanical removal of supra- and subgingival plaque and calculus (1, 2). Suitable oscillating scaler systems can be divided into sonic and ultrasonic scalers. Such scalers are the major source of potential aerosol and spatter contamination in dental practices besides high-speed hand pieces (3-7), however with some differences between sonic or ultrasonic scalers (8). The reported

resurgence of bacterial diseases such as tuberculosis (9) and the presence of other pathogenic organisms with the potential for airborne transmission causes increasing concern about aerosol contamination and minor air quality in dental offices (10-12). Capturing as much cooling spray as possible seems important since there is evidence for blood contamination in spatter produced by power-driven devices (13). Therefore, recent investigations analyzed

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the infection risk through spatter in order to create a prediction model of the total number of bacteria. Thus a positive correlation between the number of decayed teeth and calculus as well as a negative correlation to preoperative rinsing with chlorhexidine was found (14). In addition to that, this pilot study looked at the use of a special new cannula combined with a high-flow evacuation system for the reduction of spatter during scaling with different sonic and ultrasonic scalers to give further recommendations for working safely.

MATERIAL AND METHODS

Manikin head and teeth test

The manikin head was equipped with periodontitis models (A-PB, Frasaco, Tettang, Germany). The jaw model of upper and lower jaw, full dentition with permanent teeth (28 teeth without wisdom teeth) and the elastic gingiva mask in pink color (A-PB WOK/WUK, Frasaco, Tettang, Germany) simulated periodontitis with advanced horizontal bone loss and isolated, deep vertical pockets. During the investigation, the root surfaces of eight test teeth (all first incisors and all first molars in both jaws; a total of 168 teeth resulting in 672 root surfaces) had to be cleaned either with a sonic or one of two ultrasonic devices. The test teeth show no furcation involvement or concavity of the root surface and the probing depths were 4-6 mm. No calculus was applied locally considering the fact that the primary aim of this study was to imitate the patient's treatment with power-driven devices during SPT to investigate the formation of liquid deposit and droplets. Therefore a maximum of two minutes was allowed for the instrumentation of one tooth (15). Badersten et al. (15) and our pre-trials had shown that this time span is

sufficient for biofilm removal with instruments during SPT and did not restrict the work of a trained operator (16).

Instrumentation procedure

The three power-driven devices for sub-/supragingival scaling were randomly assigned to the three suction devices using a computer-generated table of random numbers. One sonic scaler AIR (Synea, W&H, Bürmoos, Austria) and two ultrasonic hand-pieces TIG (Tigon+, W&H, Bürmoos, Austria) and VEC (Vector, Dürr, Bietigheim-Bissingen, Germany) were used with slimline tips (P60 and P1, W&H, Bürmoos, Austria; P1, Dürr, Bietigheim-Bissingen, Germany). One experienced operator (C.G.) performed all study procedures during all 18 trial series; six trials for each of the two high-volume evacuation cannulas with a bore diameter of 12 mm (STS: standard suction cannula and PS: prophylaxis cannula; Dürr, Bietigheim-Bissingen, Germany) and six trials for a saliva ejector (Pluradent, Offenbach, Germany) with a bore diameter of three mm (CDS) (fig. 1). The operator wore black, nonabsorbent clothes and gloves. The camera was placed at a distance of 1.93 m from the ground above the manikin head from where a baseline picture was taken. For demonstrative purposes see Figure 2a: experimental setup under normal light conditions. Scaling was performed with the assigned sonic or ultrasonic unit for a standardized period of time of two minutes. During instrumentation the two different suction cannula as well the saliva ejector were used with a high-speed evacuation system (VAS 300 S, Dürr, Bietigheim-Bissingen, Germany) with a standardized suction volume of 300 ml/min and a depression of 180 mbar.

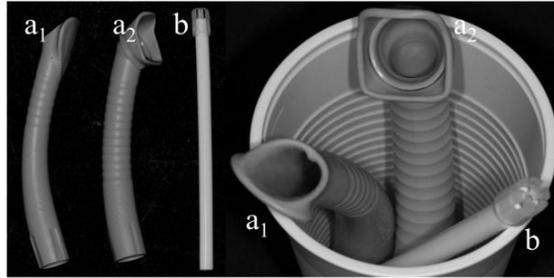


Fig. 1. The three tested cannulas; (a1) STS and (a2) PS as high-volume evacuation devices with a bore diameter of 12 mm and (b) a saliva ejector with a bore diameter of 3 mm (CDS). All of them were combined with a high-flow evacuation system.

Treatment room and visualization of spatter contamination

For the current investigation a treatment room at the Department of Conservative Dentistry and Periodontology in Kiel without any ventilation system was darkened and all surfaces 1.5m² around the manikin head (see Figure 2a, red rectangle measuring 1.11m x 1.35m) were colored with matt black lacquer (Plasti Dip Deutschland GmbH, Aschaffenburg, Germany). To visu-

alize the spatter, droplets and deposit during treatment, 50 mg/l fluorescein (Uranin, Niepötter Labortechnik, Bürstadt, Germany) was added to the water supply, which would fluoresce with bright orange color when exposed to ultraviolet light (UV-A, 350-370 nm). Therefore not only deposited fluorescing material on all black surfaces but also non-deposited airborne particles floating between the floor and the camera were visible in the photographs (fig. 2b).

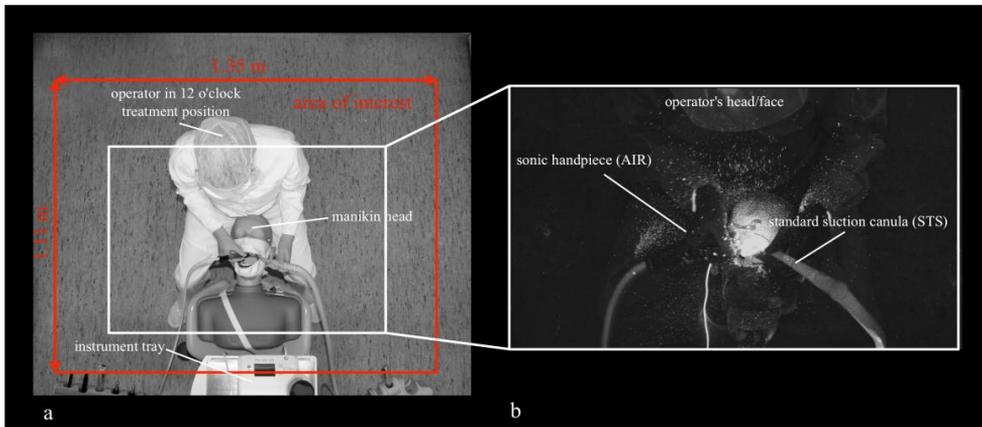


Fig. 2. The treatment room with the dental unit and the operator in 12 o'clock treatment position. (a) For demonstration purposes: experimental setup under normal light conditions and no black lacquer coverage of all surfaces/black clothes. The assessed area of interest of 1.5 m² is marked by red frame. (b) Photo taken under experimental conditions: Enlargement of framed area after 120 s of scaling the first incisor in the right maxilla with sonic instrument AIR and standard suction cannula STS.

Plan metric evaluation of spatter contamination

The evaluation of the contaminated area with spatter and droplets was plan metrically assessed. To enable standardized evaluation through the camera, the manikin head was placed over fixed marks on the ground in the treatment room for a reproducible position (fig. 2). Due to the downward facing camera position, the surface directly underneath the manikin head wasn't measurable (fig. 2). Using a camera (Canon, EOS D30, Tokyo, Japan) with a 18 – 55 mm zoom (EFS, Canon, Tokyo, Japan), eight photographs of the work area were recorded (every 15 seconds during two minutes of instrumentation for each tooth). Focus and position were checked on a monitor (HP Compaq LA2205wg, Hewlett-Packard GmbH, Böblingen, Germany) and the photographs then transferred to the evaluation program by means of digitizer software (NIH Image, Version 1.41, National Institutes of Health, Bethesda, USA). To evaluate the individual aerosol and spatter distribution at every point of time during scaling, the program (Excel 2013, Microsoft Corporation, Redmond, USA) was set up to draw standardized data masks with quadrangle arrays of 12 x 12 pixel (4.6 mm x 4.6 mm), which assisted in including the determined area in the evaluation. The percentage of the spatter distribution area was calculated via selective marking of the contaminated areas from the base area of 69984 quadrangle arrays through simple scoring of positive or negative areas, in which the bright orange color of the marker was seen. Due to the absence of measurement of the fluorescence intensity, only a quantitative analysis of the deposit distribution was possible.

In order to determine the amount of water routinely used, the flow of water during one minute was measured using a graduat-

ed cylinder. Prior to each trial, the operator adjusted the coolant flow for the sonic and ultrasonic scaler to the clinically ideal level of 25-30 ml per minute as recommended in literature (17). The actual amount of cooling water was measured during all trials.

Statistical analysis

Statistical analysis was performed using SPSS (SPSS Statistics 20, IBM, Chicago, IL, USA). The assumption of a normal distribution of data was checked by the Shapiro-Wilk test. Differences between the operator's localization, suction devices and instruments were analyzed using the Kruskal-Wallis non parametric ANOVA. Post hoc tests were afterwards performed by the Mann-Whitney-U test, whereby the significance level was adjusted after the Bonferroni Method (α divided by the number of performed tests). Deviation within teeth was calculated by the Wilcoxon test. Differences in coolant flow measurements were assessed using the t-test. All statistical tests were two-sided and used a significance level of $p=0.05$.

RESULTS

High-volume evacuation with PS and STS versus saliva ejector CDS

In regard to the suction devices the Kruskal-Wallis test showed significant results ($p<0.001$). The high-volume evacuation systems combined with the two cannulas STS (0.17 [0.07; 1.04]) and PS (0.18 [0.07; 1.14]) showed a similar reduction of the aerosol ($p=0.302$). Compared to the saliva ejector CDS (1.01 [0.12-5.78]) they were more effective ($p<0.001$ and $p=0.002$, respectively) (fig. 3). After subdivision in supra- and subgingival scaling we saw a favourable trend for subgingival scaling, due to the Bonferroni adaption STS and PS now differing significantly for subgingival (0.07 [0.03; 0.9] and 0.18

[0.07; 1.06]; $p=0.029$). Nevertheless, when performing supragingival scaling there existed no significant differences in spatter formation (tab. I).

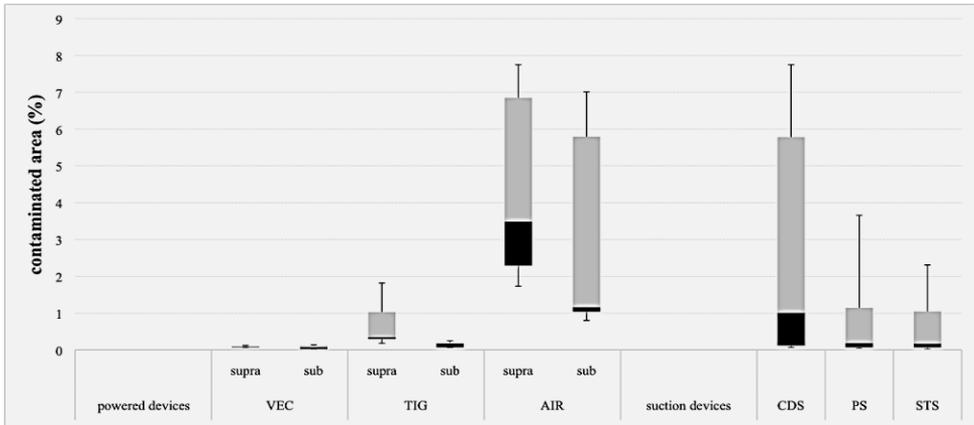


Fig. 3. Illustration of the contamination area (whiskers show minimum and maximum data) divided into the different power devices AIR, TIG and VEC as well as into the different evacuation methods STS, PS and DTS.

TABLE I

Area of contamination (median [25th; 75th percentiles]) divided by the different power-driven devices: sonic scaler (AIR) and two ultrasonic scalers (TIG and VEC) as well as by the high-volume evacuation systems combined with the standard cannula (STS) and a newly developed cannula (PS) and the conventional saliva ejector (DTS).

Power-driven device	Contaminated area (in total)	Contaminated area (supragingival scaling)		Contaminated area (subgingival scaling)			
AIR	2.5 [1.16; 6.05]	3.49 [2.29; 6.85]]]]	1.16 [1.04; 5.79]]]]		
TIG	0.25 [0.18; 0.88]	0.34 [0.3; 1.03]		$p<0.001$		0.18 [0.07; 0.19]	$p<0.001$
VEC	0.08 [0.06; 0.1]	0.09 [0.07; 0.09]		$p<0.001$		0.07 [0.03; 0.11]	$p<0.001$
Suction device							
STS	0.17 [0.07; 1.04]	0.31 [0.09; 2.01]]]]	0.07 [0.03; 0.9]]]]		
PS	0.18 [0.07; 1.14]	0.29 [0.09; 3.22]		$p=0.993$		0.18 [0.07; 1.06]	$p=0.029$
CDS	1.01 [0.12-5.78]	1.04 [0.1; 5.93]		$p=0.155$		0.23 [0.12; 5.79]	$p<0.001$
Localization							
Maxilla		0.44 [0.1; 2.36]]]]	0.23 [0.06; 0.62]]]]		
Mandible		0.26 [0.12; 1.98]		$p=0.874$		0.11 [0.07; 1.1]	$p=0.155$
Incisors		0.47 [0.11; 2.73]]]]	0.15 [0.06; 1.13]]]]		
Molars		0.27 [0.11; 1.64]		$p<0.001$		0.14 [0.07; 1.02]	$p=0.926$
Maxilla	Incisors	0.57 [0.1; 2.67]]]]	0.22 [0.03; 0.59]]]]		
	Molars	0.38 [0.08; 1.84]		$p=0.604$		0.21 [0.05; 0.41]	$p=0.008$
Mandible	Incisors	0.35 [0.12; 2.59]		$p=0.339$		0.11 [0.07; 1.21]	$p=0.217$
	Molars	0.24 [0.14; 1.43]				0.11 [0.07; 0.99]	
Treatment position 8-9 o'clock		0.25 [0.09; 1.68]]]]	0.11 [0.04; 0.63]]]]		
Treatment position 10-12 o'clock		0.49 [0.12; 2.68]		$p<0.001$		0.21 [0.1; 1.32]	$p<0.001$

Statistical significance was verified with the Kruskal-Wallis test and followed by post hoc Mann-Whitney-U test (operator's localization, suction devices and instruments) and by the Wilcoxon test (teeth). For better understanding we left out the results from the Kruskal-Wallis ANOVA.

Power-driven devices

The size of the contaminated area was significantly different during supragingival scaling for the three different scalers (all groups $p < 0.001$): AIR, TIG, VEC (fig. 3). The same results were found while performing subgingival scaling (all groups $p < 0.001$) (fig. 3). Irrespective of the power-driven device used, subgingival scaling led to a lower contaminated area in percent (median [25th; 75th percentiles]: 0.18 [0.07; 1.05]) compared to supragingival scaling (0.34 [0.1; 2.24]) ($p < 0.001$).

Spatter contamination and treatment position

A significant difference in the contaminated area was found concerning treatment positions regardless of the used instrument or the suction device (all groups $p < 0.05$). The contamination in 10-12 o'clock treatment position was higher than in other treatment positions. The highest contamination was generated when scaling the upper incisors supragingivally (0.57 [0.1; 2.67]). During supragingival instrumentation and evacuation there were significant differences between incisors and molars to be found ($p < 0.001$). For subgingival scaling the results were not significant ($p = 0.926$). There were no significant differences seen for neither mandible vs. maxilla nor for supra- vs. subgingival scaling ($p = 0.874$).

Coolant flow

The mean coolant flow measured during all six trials varied from 27.7±2.7 ml (TIG), 30.1±3.5 ml (AIR) to 30.5±1.9 ml (VEC) per minute. During these trials the loss of coolant medium, potential for generating spatter and aerosols, was without significance ($p = 0.378$) for TIG (2.7±1.4 ml/min) and VEC (2.4±1.5 ml/min) except for sonic scaler (AIR). The use of sonic

scaler AIR resulted in an increased loss of 4.7±2.4 ml/min ($p = 0.054$). The percentage of evacuated coolant (amount of evacuated coolant medium x 100/amount of used coolant medium) was 47.0±14.8 for the STS and 44.3±16.1 for PS ($p = 0.873$) and was significantly less by 6.3±7.8 for the CDS ($p = 0.001$).

DISCUSSION

Previous research has shown that ultrasonic and sonic scalers, are routinely established and used in modern prophylaxis and periodontal treatment (18, 19), but with the disadvantages to generate spatter and aerosol (8, 20-22). Both can contain airborne or blood-borne pathogens (23) and may cause various infections such as legionellosis, tuberculosis or hepatitis (24-26) or other more insidious problems like watery eyes, running noses, headaches or itchy skin (27). Several authors strongly suggest that dental staff using power-driven devices for scaling may be at a greater risk than other healthcare workers (7, 8, 27). Nevertheless, no clinical study has so far shown a direct cause-effect relationship between bacteria-contaminated spatter or aerosols and infections. It seems indisputable that spatter produced by ultrasonic or sonic scalers is greatest in the immediate vicinity of the patient. But an alteration of bacterial contamination in a distance of up to three meters from the patient can still be recognized (24), particularly when using airpolishing equipment (28). However, it is mostly assumed that splashes of water droplets move around 1.2 to 1.8 meter from a patient's oral cavity (6-8, 29, 30). Therefore, and due to the limitation of our operating room, the area of interest for a single operator was defined as a maximum of 1.11 m x 1.35 m. The generated dispersion in this current investigation given in % of the

defined area seems very small. This is not actually the case since the spatter contamination of e.g. 1.01% during the use of CDS alone caused a contaminated area of at least 0.02m². This adds to 123 x 123 mm (15150 mm²), which equates to the entirely coated palms of the operator, being completely polluted with potentially infectious spatter.

However, through the use of special aerosol reduction devices some investigators have decreased the contamination by nearly 90-97% (31, 32). But those reduction systems are not very common and the spatter development during air polishing is not comparable to those of sonic-/ultrasonic scalers. Jacks (31) discussed that the negligence of the operator to use such special reduction systems could be a result of the difficulty to handle two bulky instruments simultaneously. This corresponded with our observations during the use of the newly developed cannula PS, which tended to be too cumbersome to use. The anticipated improvement in the standard cannula SPS, therefore, failed.

Irrespective of the simple and inexpensive methods for the control of dental aerosols and spatter already available (33), dentists do not apply those methods mostly because of low awareness of health risks, working habits and economic factors (7). Due to the experimental setup of our investigation without air collection, it was difficult to find similar results for aerosol contamination in the studies we cited, which made use of real time aerosol monitoring (grams/cubic meter). It can be assumed that there were inspirable particles emitted due to scaling, which can be termed as aerosols. Nevertheless our study technology only measured spatter, droplets, deposits and non-deposited airborne particles. Therefore, we added the effectiveness of suction during scaling [ml] to discuss potential

coolant medium for spatter. A similar effectiveness for STS and PS of nearly 50% and significant result of 6% with a saliva ejector could be found, corresponding to the results of Jacks (31). The results re-emphasized the statement that a lot of coolant medium is potentially present to generate aerosol (fig. 4). In a separate experiment we were able to visualize the spatter production induced through the tip movement during the first two seconds for an area of 0.50 x 0.80 m (fig. 5). According to Timmermann et al. (34), piezoelectric devices, as a result of their linear tip movement (35), should produce less spatter than sonic scalers with almost circular tip movement and a greater amplitude (36). This was in accordance to the spatter production of the two piezoelectric devices in this current investigation, which was significantly lower and more or less target-oriented compared to the sonic scaler (VEC 0.08% and TIG 0.25% versus AIR 2.5%) (fig. 6). According to this, one should carefully consider the choice of instruments, especially when treating potentially infectious patients, and if necessary opt for the use of an ultrasonic scaler.

Due to the higher risk of generating spatter, especially during the use of sonic scalers, only high-speed evacuation systems with a standardized suction volume of around 300 ml/min, as employed in the current investigation (VAS 300 S, Dürr, Bietigheim-Bissingen, Germany), should be used. This recommendation is similar to other studies (37, 38) and shows that the only efficient method for controlling contaminated spatter is the use of a large-diameter high-volume evacuator, instead of e.g. reducing the cooling water supply (28). Heat is produced during operating mode for all power-driven devices (17, 39) and only using cooling medium minimized heat gen-

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eration to physiologically tolerable levels (39). Consequently, the necessary cooling during root instrumentation leads to the reality that even small amounts of irrigation can result in potentially contaminating spatter (8). Our results also show that an entire elimination is impossible and, therefore, instrumentation of infectious patients with hand instruments may be recommended (40). Since a salivary ejector can only re-

move a small volume of air, it's sole use proves ineffective to remove aerosols and spatter (31, 32). However, the use of the special newly developed cannula (PS) for high-volume evacuation in our investigation seems to neither improve spatter reduction (0.18% contaminated area) nor improve the effectiveness of suction (44%) compared with a standard cannula STS (0.17% contaminated area, 47% effectiveness of suction).

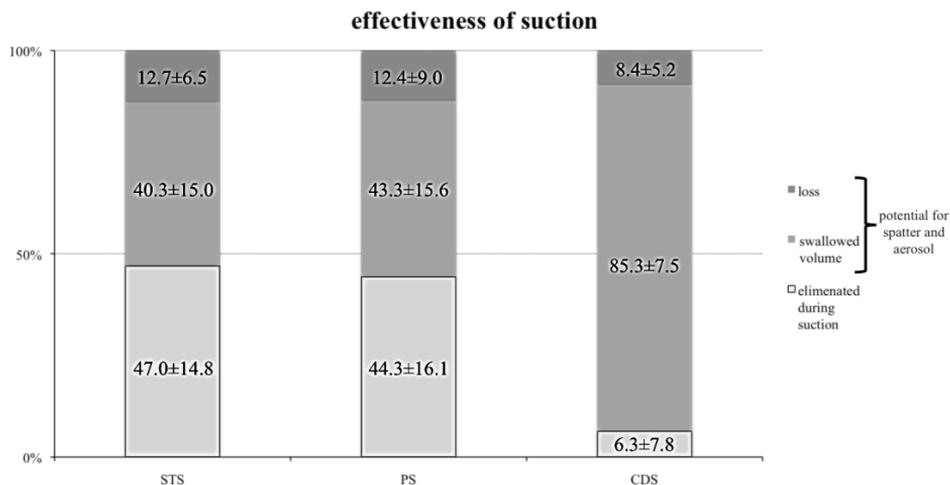


Fig. 4. Illustration of the effectiveness of cooling medium evacuation (%) divided by the three different evacuation methods: standard cannula (STS), the newly developed cannula (PS) and the conventional saliva ejector (CDS).

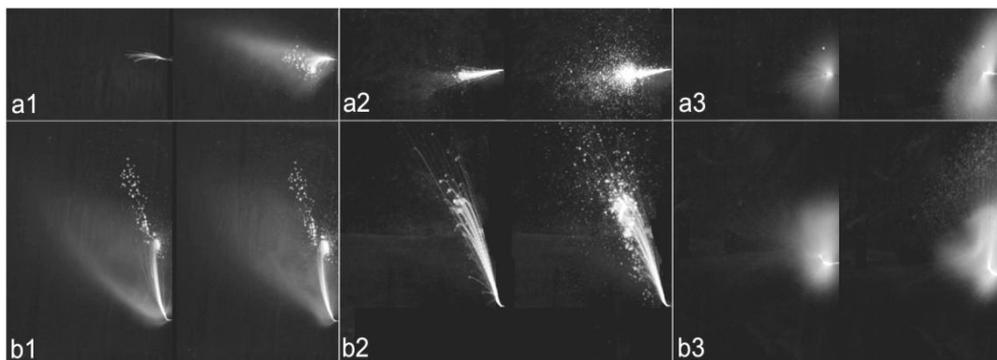


Fig. 5. Spatter and aerosol production right after start and after 2s of tip movement using the two ultrasonic scalers (a/b1: TIG, a/b2: VEC) and one sonic scaler (a/b3: AIR). The upper pictures (a1-a3) show the tip movement in vertical direction and the lower pictures (b1-b3) in horizontal direction.

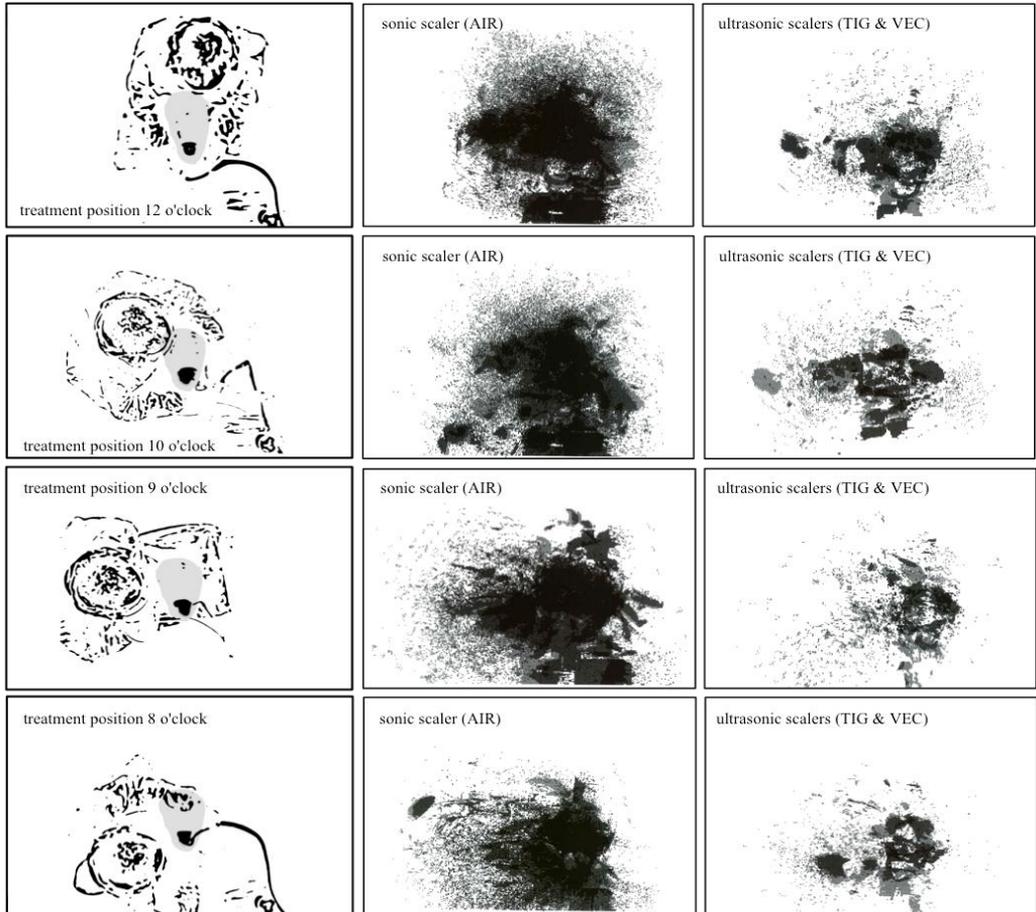


Fig. 6. Area of contamination in the treatment room (measured area: 1,11 m x 1.35 m) according to the treatment positions 8, 9, 10 and 12 o'clock as a summation of 18 trials with a sonic device (AIR) and 18 trials for each of the two ultrasonic devices (TIG and VEC). Due to the identical characteristics, the two ultrasonic scalers were analysed together for this visualization. All three different evacuation systems (STS, PS and CDS) were used. The gradation of the spatter was as follows; black was used when the area was contaminated in all 18 trials, dark grey was used when the area was contaminated in 8 to 17 trials and light grey was used when the area was contaminated in 1 to 7 trials.

Along with the already discussed variables such as instruments and type of suction, the part of the dentition that is being worked on as well as the treatment position greatly influence the occurrence and spreading direction of spatter. In this context, the lips can work as a protection visor,

when working from a 12 o'clock position (41). The results of our investigation showed a different picture for the risk of contamination also in this treatment position, especially during the use of the sonic scaler with significantly more spatter production (fig. 6). It could be possible that a

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single operator is often unable to work the suction from buccal and therefore spray rebound is unavoidable even from a 12 o'clock position. Another fact to discuss may also be the characteristic of the less flexible lips due to the rubber material and the maximum opening of the manikin head's mouth. However, the use of the PS as well as the STS seems cumbersome from a subjective point of view.

One limitation of this study as well as other studies was the 2D visualisation of the treatment room (fig. 2) (41). Only the horizontal dimension of the area of interest was photographically documented during treatment. The spatter, which settles on vertical surfaces such as furniture of the room, clothes, the face or face guard, is only conditionally viewable. Even the modified technique, with a fluorescein solution we used to visualize spatter and droplets, could not solve these problems, even though it seemed that the spots produced on horizontal areas could be evaluated more accurately compared with the erythrosine (13). Another aspect that has to be mentioned is that the size of the spatter produced by the sonic and ultrasonic devices seemed different (fig. 5), but the sensitivity of the used detection method failed to measure this. The analysis of the difference between the used and the sucked in volume of cooling medium cannot solve that problem, nevertheless the amount of lost cooling water that can potentially form spatter as well as aerosols was shown (fig. 4).

Despite the limitations of the research design, it can be said that by using the opening of the mouth as a shield, a reduction of the risk of contamination for the posterior teeth can be assumed from all treatment positions. Still a higher risk of

infection for the dentist in treatment positions like 12 o'clock for the anterior teeth has to be discussed. It seems that in the treatment position behind the patient's head the face of the operator, eyes and nose are most important for transmission of infections (42), as well as his chest area (30, 43) are the most contaminated area. Therefore it is recommended to use protective means like glasses, masks and especially in treatment positions between 10 and 2 o'clock as a protective shield, which offers the greatest protection in this area. Furthermore, the use of pre-procedural rinsing with an antiseptic mouthwash may be of value in protecting patients and dental professionals due to the reducing effect on the microbiology flora of the oral cavity (43-48).

CONCLUSIONS

The risk of spatter contamination of the area next to the patient's mouth during scaling increases with the use of sonic versus ultrasonic device as well as with the use of saliva ejector versus high-volume evacuation devices. Also the treatment position of the operator and the region of the mouth that is being treated can influence the generation of potentially infectious spatter. It is therefore strongly advised to use high-volume evacuation devices and to wear a visor during treatment in all positions behind the patient's head to protect the face of the operator. Since even under ideal conditions spatter cannot be avoided, it is strongly recommended to follow the common suggestions for protection during dental treatment: use of eye protection, masks, gloves, clothes coverage and rinsing the oral cavity of a patient pre-procedural with antiseptic mouthwash (7, 12, 33, 46, 48).

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NEWS

RELATIONSHIP BETWEEN OBESITY AND ORAL DISEASES

The aim of a study realized by a group of researchers from University of Benin, Nigeria was to determine the relationship between obesity and periodontal status and dental caries experience of a group of nigerian dental patients. Participants were selected from patients attending dental outpatient clinics of the University of Benin Teaching Hospital, Benin City, Nigeria. Their weight and height were measured and body mass index (BMI) estimated in kg/m^2 , gingival health assessed using bleeding on probing index, oral hygiene estimated using the simplified Oral Hygiene Index (OHI-S), periodontal health estimated using the Basic Periodontal Examination (BPE) and caries experience was estimated with the Decayed, Missing, Filled teeth (DMFT) index. A few participants (3.8%) were underweight, 52.6% fell within the normal BMI range, 28.2% pre-obese, 12.2% obese class I and 3.2% obese class II. The mean OHI-S score was 2.16 ± 1.13 among the overweight participants and 2.05 ± 1.13 among those who are not ($P = 0.543$). The mean DMFT score was 3.03 ± 4.25 among the overweight participants and 2.32 ± 3.01 among those who are not ($P = 0.223$). Sixty-five percent of participants with BPE score of 0, considered to signify periodontal health, had normal BMI while all the participants with the worst BPE score recorded belong to the obese 1 group ($P = 0.070$). The binary logistic regression revealed that the likely predictor of gingival bleeding in the study is BMI between 35.0 and 39.9 (obese class 2) ($P = 0.046$, odds ratio = 0.07, 95% confidence interval = 0.01-0.96). It can be concluded that there was no statistically significant relationship between obesity and periodontal status and dental caries experience in the studied group of dental patients. Increased body mass index may however be a predictor of gingival bleeding (Sede MA, Ehizele AO. Relationship between obesity and oral diseases. *Niger J Clin Pract*, 2014 ; 17 (6) : 683-690)

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