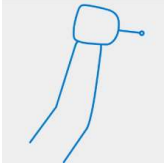


Blocking spray air  
→ COVID-19 measure  
2020-04-02

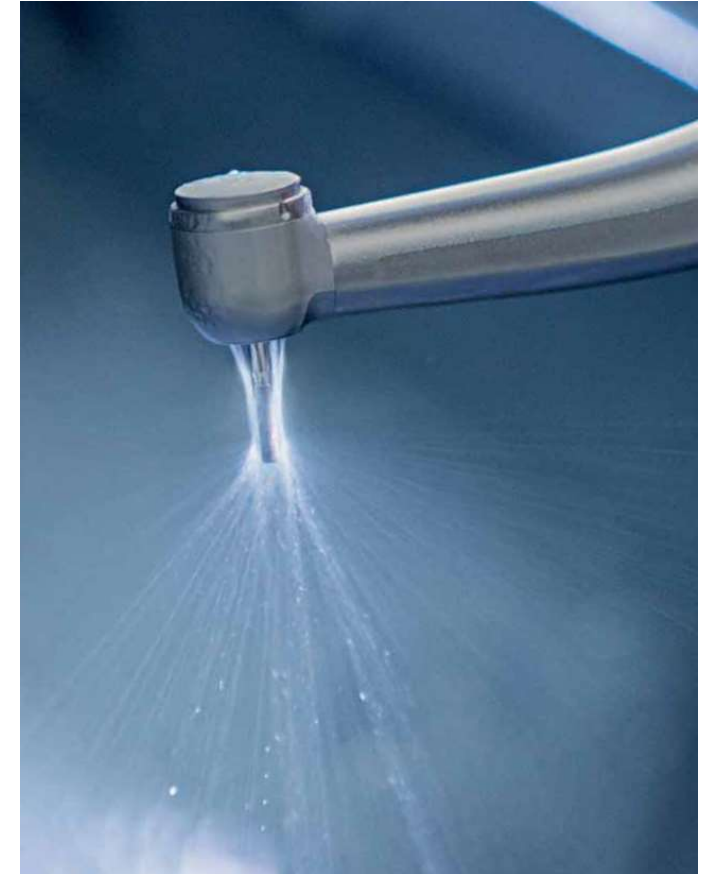
---

Supported by International Special Clinic Solutions



## The Idea

- Spray air contributes significantly to spray mist in dental instruments
- Blocking the spray air leads to more ringed spray mist, **therefore reducing the risk of coronavirus transmission**
- The German Assembly of Federal Dentists BZÄK **recommends to reduce spray mist in order to limit the creation of aerosols.**





# Assembly

1. Disinfect the pin
2. Wet the pin with a T1 spray to increase the adhesive effect
3. Disconnect the M&T supply hose from the treatment unit
4. Insert the pin in spray air tubes (fig. A1) until stop
5. Carefully assemble the hose. Make sure that the pin does not fall out



Pin



Fig. A1



Fig. A2



Fig. A3

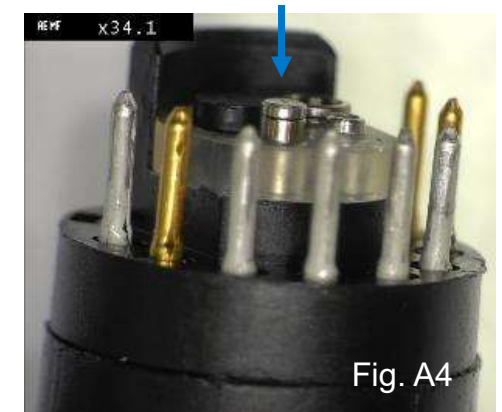


Fig. A4

6. To remove the hose, switch on the treatment unit and unscrew the hose (air pressure will keep the pin in the hose)



# Test series with Thomas Ertl (01.04.2020): Summary

- ✓ Without cooling air, the spray is noticeably coarsely dissolved - **not finely foggy as with cooling air** (fig. B1, B2, C1, C2)
- ✓ When the spray water hits the drill at high speed, the spray is pulverized - but not as finely as with air (fig. B1, C1)
- ✓ The 1D spray (Midwest E mini) slightly misses the drill – **this creates virtually no spray mist** (!). The 4D spray creates a (coarser) fog when the water hits the drill at high speed (fig. B1,B2, C1, C2)
- ✓ **The cooling on the tooth without air is sufficient**, even at 23 ml/min (i.e. no brown discoloration recognizable); at 23 ml/min a clear odor is noticeable (especially with 1D spray, fig. E1 – E3); at 46 ml/min the smell is hardly present (fig. D1 – D3)
- ✓ The behavior of the 4D spray from W&H or the 3D spray from KaVo is comparable to our 4D spray. When operating without cooling air, the spray mist at W&H appears somewhat less pronounced – when operating with cooling air, the spray mist is stronger than with our instruments, e.g. due to “mixing chamber” principle.
- ✓ **Occlusal cavity**: Water remains in the cavity, even if the drill is continuously removed from the cavity. The liquid then needs to be removed with the air blower (fig. D1)
- ✓ **Trepanation**: no brown discoloration even at pulp chamber opening (fig. D1 – D3, E1, E3).
- ✓ With the 1D handpiece there was one occurrence of brown discoloration (fig. E2); **this was however not reproducible despite forced approach** (further cavity drilled with high pressure on the drill and cavity with high aspect ratio, deep and thin)



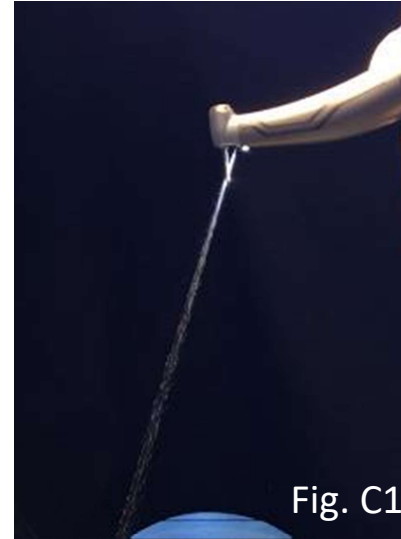
## Results: Spray



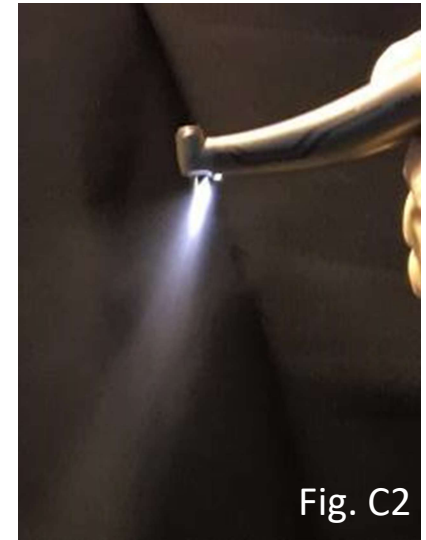
only spray water (4D)



spray water & air (4D)



only spray water (1D)



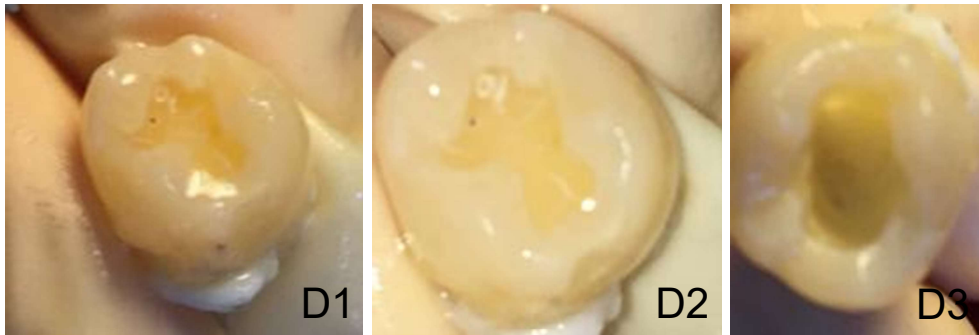
spray water & air (1D)

➔ Without spray air and with reduced spray water, the resulting spray mist is significantly more contained

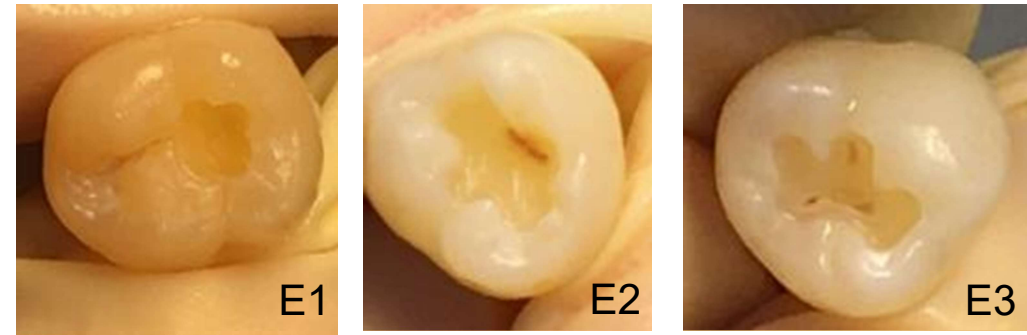


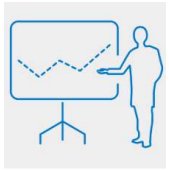
## Results: Teeth

4D Spray, 23 ml/min., only water



1D Spray, 23 ml/min., only water





## Test series by Prof. Kocher, University of Greifswald (01.04.2020): Summary

- ✓ **COVID-19 requires special measures from clinics** to continue patients' dental treatments whose health status is unknown.
- ✓ **The aim of this validation** was to demonstrate if this solution could be applied to treat patients at risk in a dental office.
- ✓ Reduction in spray air was implemented by **introducing a blocking part** between hose and engine in the spray air line.
- ✓ Laboratory tests proved that lowering the aerosol cloud emitted during a treatment using a contra-angle handpiece contributes to **reducing the potential risk of a healthcare provider. The necessary cooling on the tooth is still ensured.**
- ✓ **Safety and performance are guaranteed:** The medical benefit outweighs the risk.  
This is an additional safeguard to complement already existing personal protective measures that must not be reduced.
- ✓ Considering the current situation due to COVID-19 these tests at the University of Greifswald **confirmed that the suggested solution of turning off spray air can be applied in a clinical setting.**





## Summary

- ✓ Spray without cooling air is much more contained (coarse & less spread)
- ✓ Teeth are not damaged without cooling air
- ✓ Very low water flow does not damage teeth in the large majority of cases;  
strong odor serves as indication to exert less pressure on the tooth
- **proper treatment can be done without major restrictions**
- ✓ 1D spray is favorable due to reduced mist



➤ **Next step: Detailed examination**





## Extract from product standard ISO 14457

### 5.6.2.4 Spray air supply

Spray air coolant capability may be provided at the discretion of the manufacturer. Handpieces having spray air coolant capability shall direct air to the working end of the rotary instrument. If water and air are used simultaneously, a cooling mist shall be created and transmitted to the working end of the rotary instrument. If spray air functionality is separate from drive air, the handpiece shall be capable of attaining an airflow rate of at least 1,5 NL/min at 200 kPa (2,0 bar).

### 5.6.3 Water supply

The handpiece, if applicable, shall provide a coolant capability to the working end of the instrument at a flow rate of at least 50 ml/min at 200 kPa (2,0 bar).

➔ Spray air is not mandatory to meet the standard