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Micro Air-Water Syringe for All Dental Clinicians

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KEYWORDS :

Introduction:

Mark Shelton [1] in his book '*Working in a very small place', the making of a neurosurgeon*, describes the effort of Dr Peter Janetta to introduce the use of microscope for cranial nerve decompression, a procedure carried out in a very small space which can be immensely benefitted by magnification. A similar parallel can be drawn in dentistry specially endodontics in terms of the working space being restricted. This space constraint has been reflected in the use of microscope for carrying out endodontic procedures and development of instruments like microsurgical mirror, ultrasonic tip, fine irrigating needles and Stopko irrigator.

Stropko irrigator™ (Sybron dental specialities Inc,Orange, CA) is an irrigator/drier developed by Dr. John J. Stopko. It delivers an accurate stream of water/ air which has multidisciplinary uses.[2] It comprises of an attachment which can be adapted to most of the three way syringe designs, this attachment on the free end has a receptacle to which syringes of various gauge can be attached depending on the requirement . The stropko irrigator though a useful device with various application is expensive and the cost can be prohibitive to its use. Moreover the availability of this device specially in developing countries/ remote areas is limited. An ordinary needle adapted to a three way syringe without any special attachment can serve as an economic and readily available alternative for Stropko irrigator (Figure. 1).

Description of micro air- water syringe :

The attachment of a thin gauge needle to the three way dental syringe works in the following manner :

a. The thin needle can be used to deliver air/ water / any other solution in difficult to reach areas like the gingival sulcus the root canal.
b. The needle can be contra angled further improving the access
c. It should be secured with a plaster to to prevent the needle from being shot-out .
d. We checked the pressure of the air and water expressed through the needle and compared it with the pressure of air and water of the three way syringe(30-40 psi) and it was found that the pressure is considerably low in case of thin gauge needle(7-10 psi), this low pressure can be useful in certain situations as discussed in the applications (Table 1).

Applications:

In conjunction with Surgical Operating Microscope- any procedure performed under surgical operating microscope which requires precise irrigation or drying will be benefitted by this equipment. As the magnification increases the field of view (FOV)decreases, at higher magnification a large instrument like the tip of air water syringe will occupy a large portion of the FOV and thus obscure the vision of the operating field. The thin needle attached to the air / water syringe will precisely deliver air / water without obscuring the operating field.[3]

Prevent overdrying- the air delivered by air water syringe when used to blow dry etched dentine surface before application of bonding agent may overdry the surface which may collapse the collagen meshwork leading to improper hybrid layer formation and bond failure.[4] Since the pressure and the volume of air is less when using a thin gauge needle it will dry the surface after etching without the risk of dentin dessication.

Prevent bleeding- air drying the cavity walls / finish line close to gingiva often provokes bleeding and contaminates the operating area, this can be frustrating if the surface is etched because it will warrant re etching the surface. The low pressure and precise application of air on the tooth surface will prevent bleeding in such cases.

Surgical/ Microsurgical procedure- the air from the syringe owing to its low pressure can be used to gently dry the surgical field without the risk of splashing or emphysema. This is specially useful in microsurgical procedures like cleaning and drying the root end preparation, rinsing and drying the root end preparation after staining, and even drying the preforation site before repair.

As an adjunct to utrasonics- certain procedures using an ultrasonic tip under a microscope like locating hidden canals, retrieval of fractured instrument, root end preparation are carried out without the water coolant to improve the visibility.[5] A stream of air directed at the working area can be used as a coolant, it has the additional advantage of clearing the dentine dust and thereby improving the visibility.

Bonding- a gentle stream of air can be used to spread the bonding agent uniformly and for evapourating the solvent during bonding procedures.[6] It can be useful especially in adhesive procedures within the root canal like post cementation.

Subgingival procedures-a stream of air from the syringe can be directed into the gingival sulcus allowing inspection of the subgingival area for calculus and deposits. Gingival sulcus can be dried gently before impression making,an irrigating solution (eg chlorhexidine) can be delivered directly into the sulcus

Conclusion:

Though the technique mentioned here sounds conventional, it can be an effective alternative for the expensive micro- irrigators available commercially.

Table 1: Advantages of a Micro air-water syringe

Advantage	Reasons
Economic	· can be adapted to any three-way syringe without any special attachment
Improved accessability and visibility	· can be contraangled to improve access. · does not obscure visibility · varous gauge/ length needles can be attached
Patient safety	· chance of air emphysema less · needles can be disposedand thus eliminates the occurance of cross contamination · gentle flow of air and water with no splashing and less aerosol production

Figure 1: Micro air-water syringe



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