

Risks associated with use of a high speed air turbine drill during a dental extraction.

Dental surgeons are often pressed for time and often resort to the use of a high speed air turbine dental hand drill to perform a dental surgical intervention. Although this appears to be an easy solution at the time it places the patient at high risk of severe complications and even fatal outcomes.

What are the risks with using a high speed air turbine drill during a dental extraction?

Potential complications of high speed drill

- Subcutaneous emphysema of face, neck + chest
- Pneumomediastinum
- Facial Infection/Cellulitis
- Thoracic infections/mediastinal abscess
- Descending necrotizing mediastinitis
- Visual disturbance + visual loss
- Fatal air embolism
- Cardiac arrhythmia + Cardiac arrest
- Death
-

Subcutaneous emphysema

Subcutaneous emphysema occurs from pressurized air from dental hand-pieces entering fascial planes and accumulating in tissues. The severity depends on the amount of air entrapped, its location and its contents.

The mandible communicates with submandibular and sublingual spaces which communicate with the

pterygomandibular, retropharyngeal and parapharyngeal spaces. The retropharyngeal space communicates with the mediastinum. Air can enter and spread into any of these spaces taking with it pathogenic bacteria and other microorganisms.

Facial emphysema with orbital spread can lead to retinal artery collapse and optic nerve damage leading to permanent visual disturbance.

Spread to the ear and parotid salivary gland can cause pneumoparotis and otalgia has also been reported.

Spread down the neck can cause a mediastinal emphysema, tension pneumothorax, pneumoperitoneum and even death

Infection

Air from hand pieces will cause tissue contamination with pathogenic bacteria or fungi causing potential for infection and the more serious descending necrotizing fasciitis.

Cardiac + Respiratory effects **Fatal air embolism**

A case report of three patients dying suddenly of cardiac arrest during dental implant surgery by the same surgeon has been reported. It is believed that an air embolus was created by inadvertent injection of a mixture of air and water through the dental drill directly into the mandible spreading to the facial and pterygoid venous plexus which then entered the superior vena cava and right atrium (2,3).

Venous air embolism arises from the ingress of air into the venous system which is transported to the right atrium and

ventricle. This air can pass on to the pulmonary circulation where it may interfere with gas exchange, cause cardiac arrhythmias, and even cardiac failure and arrest. A large bolus of air can cause an air lock in the right atrium and ventricle leading to outflow obstruction and a decreased cardiac output.

Summary

Practitioners are warned about the dangers of using air-driven equipment during dental surgery.

References

1. Joseph L. Nates, Morris Gertel: Subcutaneous And Mediastinal Emphysema During Dental Treatment Under General Anesthesia. *The Internet Journal of Anesthesiology*. 200. Volume 4 Number 1.
2. Davies JM, Campbell LA. Fatal air embolism during dental implant surgery: a report of three cases. *Canadian journal of anaesthesia*, 1990, 32:112–21.
3. Wittenberg AG. Venous air embolism
www.emedicine.com/EMERG/topic787.htm