

## Oral Vascular Lesion and Management

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### Abstract

**Introduction:** Vascular lesions are one of the most common congenital and neonatal abnormalities and are frequently seen in the oral and maxillofacial regions leading to functional and aesthetic problems. They are a heterogeneous group of conditions which range from being harmless or with a little clinical significance to being potential life-threatening condition. The correct diagnosis of the lesion, the appropriate classification, and clinical appearance of these vascular lesions helps in understanding the etiology and further aids in treatment planning. It is important for a dentist to have sound knowledge and understanding of these vascular lesions to reduce the possible risk and complications faced during the treatment and reduce it to a minimum.

**Aim of the Study:** The aim of the review is to summarise various vascular lesion of the oral cavity, pathogenesis, diagnosis, and management of the same, and their relevance to the dental practice.

**Methodology:** The review is a comprehensive research of database PUBMED from the year 1976 to 2016.

**Conclusion:** The vascular lesion occurs anywhere in the body, and each lesion may have its own set of complication which can be encountered during dental treatment. The dentist and doctors thus should have a better diagnostic awareness and understanding of all the types of vascular anomalies and should be able to differentiate between tumors and other vascular anomalies. An early diagnosis is important criteria as it is helpful in patient reassurance regarding the condition present and further aids in proper intervention when required and optimal management of the same. When essential, the dentists should refer the cases to the specialist to assess the potential risk involved and to avoid them as much as possible.

**Keywords:** *Capillary Haemangioma; Pyogenic Granuloma; Arteriovenous Malformation; Capillary Malformation; Lymphatic Malformation; Venous Malformation*

Vascular lesions are localized structural defects of the vasculature and show a confusing clinical presentation since most of the vascular lesions appear blue, pink, and red color. The same word has been used to describe the wholly different vascular lesions such as haemangioma with differing etiologies, which had led to the improper diagnosis, misdirected research, and illogical treatment [1].

### Classification

According to Mulliken Classification, vascular anomalies can be classified as follow [2].

Vascular Tumours	Vascular Malformation
<ul style="list-style-type: none"> <li>• Infantile Haemangioma</li> </ul>	<ul style="list-style-type: none"> <li>• Arteriovenous Malformation (High Flow)</li> </ul>
<ul style="list-style-type: none"> <li>• Congenital Haemangioma</li> </ul>	<ul style="list-style-type: none"> <li>• Capillary Malformation (Low Flow)</li> </ul>
<ul style="list-style-type: none"> <li>• Pyogenic Granuloma</li> </ul>	<ul style="list-style-type: none"> <li>• Venous Malformation (Low Flow)</li> <li>• Lymphatic Malformation (Low Flow)</li> </ul>

**Vascular tumours**

**Infantile haemangioma**

Infantile haemangioma is one of the common tumors of head and neck in infants with more female predilection and affecting around 3 - 5% of children. Since they are diagnosed in infancy, these lesions are usually not encountered by the dentist in day-to-day practice. Typically, the lesion is undetectable at birth and grows rapidly after several weeks till five months of age, and regresses over the years without leaving residual scars. The commonly affected areas are lips, cheeks, and tongue. The lesions are usually detected with color doppler ultrasound imaging. Since haemangiomas show positivity for the protein ‘glucose transporter-1’, immunohistochemistry can be used to distinguish it from other vascular malformation and tumors. Most of the haemangiomas do not require surgical intervention and should be just monitored. Rapidly growing lesions can be treated angiographically by embolization of feeding arteries, which leads to lesion regression. The pharmacological management includes topical or systemic steroids, the beta-blocker Propranolol [3].

**Congenital hemangioma**

These are a distinct form of haemangioma that are already mature at birth and do not proliferate further and may involute spontaneously and disappear by the age of one. The non-involuting ones are present at birth and remain stable with no future growth [4].

**Pyogenic granuloma**

Pyogenic granuloma is a misleading term since it neither produces pus nor is granulomatous; thus, histologically, the appropriate term is a lobular capillary haemangioma. Lesion commonly affect gingivae and are true vascular tumors, benign in nature develop following local chronic irritation, traumatic injury, or altered hormonal environment, have more predilection for females and in pregnancy. The lesion appears smooth or lobulated exophytic erythematous papules with pedunculated or sessile base and is commonly seen at lips, tongue, and buccal mucosa. Minor trauma to the lesion can pronounce bleeding since the lesions are highly vascular. The lesion should be differentiated from peripheral giant cell granuloma, peripheral ossifying fibroma, metastatic cancer, haemangioma, granulation tissue, Kaposi’s sarcoma, and Non-Hodgkin’s lymphoma. Management depends on the severity of symptoms. Small, painless lesion not causing bleeding can be just observed clinically. In pregnant women, treatment may not be needed due to lesional shrinkage in the postpartum period. The surgical excision is done down to the periosteum to prevent a recurrence. Other treatment modality includes cryotherapy, laser excision, or sclerotherapy; however, these are not commonly used [4-7].

**Vascular malformation**

These are congenital defects of vascular morphogenesis and do not show endothelial cell proliferation like vascular tumors. The vascular malformation can vary clinically, but they share the same pathogenesis and embryology. They can involve veins, arteries, capillaries, lymphatic vessels, or a combination of any of these and may result in cosmetic problems, ischaemic skin conditions, bleeding, and pain. They can be broadly divided into a high flow and low flow lesion [4].

Low flow malformations

<p>Capillary Malformation</p>	<p>They are congenital anomalies of capillary development, commonly termed as ‘port wine stains’ or ‘naevus flammeus’ appears in the superficial dermis. Usually present at birth and gradually increases in size without the tendency to involute. It is present in the head and neck region as pink macular-lesions in the distribution of division of trigeminal nerve dermatomes. The pathogenesis is thought to be an abnormal neural regulation process; defect lies in the maturation of cutaneous sympathetic innervation, causing vasodilation. Mutation in the RASA1 gene is also a suggested cause of malformation. The lesion appears pink in infancy and later turns red in adulthood with a raised modular cobblestone appearance with rubbery consistency on palpation. The lesion is associated with rare autosomal dominant inheritance ‘SturgeWeber syndrome,’ which is characterized by classic ‘port-wine stain’ usually in the ophthalmic division of the trigeminal nerve. The underlying area of the cheek, lip, or gingivae may also be affected, showing gingival hypertrophy and chronic bleeding. Small malformation does not require treatment. The larger malformation can be treated before the age of 6 months, using pulsed-dye laser photocoagulation since it may cause tissue hypertrophy in the skin and further disfigurement [8,9].</p>
<p>Venous Malformation</p>	<p>Venous anomalies are the most common type of vascular malformation, which can vary in morphology and are made up of abnormal venous channels of different sizes and thickness, which predisposes the condition of thrombosis. The malformation is due to mutation in the angiopoietin receptor (TEK). Usually present at birth, but it does not manifest itself until later childhood. The lesion is common in the skin and subcutaneous tissue of the head and neck region, more precisely in lips and cheeks. They are soft compressible masses, bluish in color in oral mucosa, no pulsation or thrill is present on palpation, they are usually painless, but pain and swelling may occur due to venous engorgement and localized thrombosis or hemorrhage. On radiographs, phleboliths can be seen, which is a pathognomic of venous malformation. Lesions with intermittent expansion, contraction, and localized thrombosis require treatment by sclerotherapy using an agent such as 3% sodium tetradecyl sulfate or ethanol, which are injected into the lesion to cause destruction of endothelial cells and subsequent luminal obliteration, fibrosis, and shrinkage of the lesion. Cryotherapy and irradiation are other treatment options [10,11].</p>
<p>Lymphatic Malformation</p>	<p>These are the second most common type of venous malformation and often mislabeled as ‘lymphangioma’ or ‘cystic hygroma,’ do not exhibit hyperplasia, and not have any proliferative or involutive phases. The pathogenesis involves the failure of embryonic lymphatic systems to separate from or to connect to the venous system. Mutation in the vascular endothelial growth receptor three, as well as TIE2/TEK (tyrosine kinase receptor), has also been a known cause. They form in the first few years of life and later grows rapidly with the need for treatment. It is further divided into macro-cystic and micro-cystic lesions. Micro-cystic lesions are made of small channels and cysts of less than 2mm in diameter lined by a single endothelial layer and usually involve skin or buccal mucosa and tongue, appear as small vesicles while, the macro-cystic lesion contains lymphocytes and proteinaceous fluid in large spaces often divided by thick intralesional septae, typically subcutaneous, translucent in appearance with normal overlying skin. The clinical appearance of the lesion may vary; they may cause major bony distortion, the tongue can typically be affected where ‘mass effect’ causes mandibular overgrowth asymmetry and subsequent functional problems. Both types of malformations are prone to infection, spontaneous haemorrhage, leading to pain or rapid expansion. On palpation, they typically lack the pulsatile thrill of high-flow lesions and do not compress. MRI and ultrasound are the imaging modalities to assess these lesions. The primary choice of treatment is sclerotherapy for a macro-cystic lesion, which aims to obliterate the cystic spaces and achieve shrinkage while the micro-cystic lesion responds better to plasma radiofrequency ablation or intralesional bleomycin injections. But both types often require surgery [12-15].</p>

High flow malformations

Arteriovenous Malformation	Arteriovenous malformations (AVM) manifest as abnormal connections between veins and arteries that permit blood within an organ or tissue to bypass the capillary network, which leads to loss of the pressure down-regulation that normally occurs. This malformation can involve several arteries shunting to a single vein or multiple shunts between arteries and venules. The dilated segment of the distal vein to this connection is known as ‘nidus.’ AVM can develop during fetal development or after birth. AVM is usually a slow-growing lesion that may grow rapidly following trauma. The symptoms include pain, bleeding, hypertrophy of perfused organ, or tissue. They are pulsatile mass with associated thrill and bruit. The lesions appear within the mandible in about two-thirds of patients and may cause bone enlargement, mobility of surrounding teeth, and gingival bleeding. In such patients, extraction of teeth and incisional biopsies carry a huge risk of hemorrhage; thus, in patients with AVM, extraction should be avoided. MRI and ultrasound are the imaging modality to assess these lesions; angiography can be used for detailed morphology and function of vascular channels. Embolization to ablate or downgrade the lesion is the choice of treatment, and surgery is often not considered due to the risk of bleeding and damage to adjacent structures [16].
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Summary of various vascular lesions and their relevance to dental practice [4].

Condition	Referral to secondary care	Safe for injections	Safe for extractions	Safe for scaling
Infantile Haemangiomas	Refer if the patient has not already been seen by a specialist	N/A	N/A	N/A
Congenital Haemangiomas	yes	Yes	Yes	Yes
Pyogenic Granulomas	Refer for assessment	Yes	Yes	Yes
Capillary Malformations	If causing cosmetic problem/concern	Yes	Yes	Yes
Venous Malformations	Consider referral if causing symptoms or if some ambiguity over the exact nature of the lesion	Do not inject into lesion	Safe if the lesion is not in close association with tooth	Avoid scaling if near lesion
Lymphatic Malformations	Refer if lesions have not been previously assessed by a specialist	Do not inject into lesion	NOT SAFE	Avoid scaling if near lesion
Arteriovenous Malformations	Refer	Not safe	NOT SAFE	Avoid scaling if near lesion

### Conclusion

Vascular lesions are disorders of angiogenesis, vasculogenesis, or lymphangiogenesis. Therefore, it is of utmost importance for clinicians to have sound knowledge regarding each of the lesions, the clinical appearance, diagnosis, and treatment modality. The dentist must refer the case when needed and be careful during treatment, which may predispose the complication related to various anomalies.

### Bibliography

1. McGill TG and Mulliken JB. “Vascular anomalies of head and neck”. *Otolaryngology-Head and Neck Surgery* 1 (1993): 333-346.
2. McCafferty IJ and Jones RG. “Imaging and management of vascular malformations”. *Clinical Radiology* 66.12 (2011): 1208-1218.
3. Chang LC., et al. “Growth characteristics of infantile hemangiomas: implications for management”. *Pediatrics* 122.2 (2016): 360-367.
4. Elias G., et al. “Vascular lesions of the head and oral cavity–diagnosis and management”. *Dental Update* 43.9 (2016): 859-866.

5. Mussalli NG, *et al.* "Oral pyogenic granuloma as a complication of pregnancy and the use of hormonal contraceptives". *International Journal of Gynecology and Obstetrics* 14.2 (1976): 187-191.
6. Taira JW, *et al.* "Lobular capillary hemangioma (pyogenic granuloma) with satellitosis". *Journal of the American Academy of Dermatology* 27.2 (1992): 297-300.
7. Moon SE, *et al.* "Treatment of pyogenic granuloma by sodium tetradecyl sulfate sclerotherapy". *Archives of Dermatology* 141.5 (2005): 644-646.
8. Izikson L, *et al.* "Treatment of hypertrophic and resistant port wine stains with a 755 nm laser: a case series of 20 patients". *Lasers in Surgery and Medicine: The Official Journal of the American Society for Laser Medicine and Surgery* 41.6 (2009): 427-432.
9. Limaye N, *et al.* "From germline towards somatic mutations in the pathophysiology of vascular anomalies". *Human Molecular Genetics* 18R1 (2009): R65-R74.
10. Brouillard P and Vikkula M. "Vascular malformations: localized defects in vascular morphogenesis". *Clinical Genetics* 63.5 (2003): 340-351.
11. Dubois J, *et al.* "Soft-tissue venous malformations in adult patients: imaging and therapeutic issues". *Radiographics* 21.6 (2001): 1519-1531.
12. Redondo P. "Vascular malformations (I). Concept, classification, pathogenesis and clinical features". *Actas Dermo-Sifiliográficas* 98.3 (2007): 141-158.
13. Jussila L and Alitalo K. "Vascular growth factors and lymphangiogenesis". *Physiological Reviews* 82.3 (2002): 673-700.
14. Puig S, *et al.* "Vascular low-flow malformations in children: current concepts for classification, diagnosis and therapy". *European Journal of Radiology* 53.1 (2005): 35-45.
15. Kim SW, *et al.* "Long-term outcome of radiofrequency ablation for intraoral microcystic lymphatic malformation". *Archives of Otolaryngology-Head and Neck Surgery* 137.12 (2011): 1247-1250.
16. Houdart E, *et al.* "A proposed angiographic classification of intracranial arteriovenous fistulae and malformations". *Neuroradiology* 35.5 (1993): 381-385.

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