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RESEARCH ARTICLE

Dental management of patients suffering from drooling: Review and update

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Abstract

Saliva has an important role in maintaining the structural and functional integrity of the oral structures. Sialorrhea is a condition wherein there is spillage of saliva beyond the margins of lip. Depending on the severity, sialorrhea might negatively affect the physical, functional psychological and social wellbeing of the patient as well as of their families and caregivers. Drooling can occur as a result of hypersalivation, oral muscle incordination or swallowing defect. Assessment of drooling includes detailed history taking and examination of the patient along with required investigations. As drooling can be a potential hazard during dental treatment, its optimum management is of utmost importance. Treatment options for sialorrhea span from conservative approaches such as modifications in diet or prescribed medications, oral muscleexercises, intraoral training devices, behavior modifications, biofeedback and speech therapy to more aggressive treatment choices such as medications includingglycopyrrolate, botulinum toxin etc., surgery or radiation therapy.

Introduction

Saliva has an important role in maintaining the structural and functional integrity of the oral structures. On an average 1.5 L of saliva is produced daily, mainly by the three major salivary glands with a minor contribution from minor salivary glands dispersed in the oral mucosa. Salivary secretion is under control of parasympathetic and sympathetic nervous system. A number of factors influence production of saliva which can alter its quality and quantity.

Over the years, lot of focus has been given to hyposalivation while issues pertaining to hypersalivationor sialorrheaare sidelined. Sialorrhea also known as drooling or ptyalism is a condition wherein there is spillage of saliva beyond the margins of lip (Hockstein et al.,2004). Drooling is common among children up to 15 to 18 months of age, however it is considered pathological if it persists beyond 4 years of age (Hockstein et al., 2004).

Depending on the severity,sialorrheacannegatively affect the physical, functional, psychological and social wellbeing of the patient as well as of their families and caregivers (Boros and Keszler, 2006). Hence it has significant negative impact on the quality of life of these patients. Sialorrheais associated with physical symptoms such as chapped lips, infection, dehydration, foul odor, soiling of clothes and approximate objects, disturbance in speech and feeding (Hockstein et al., 2004; Scully et al., 2009; Mier et al., 2000; Bavikatte et al., 2012). Sialorrhea can be associated with numerous psychological issues such as social stigma, low self-esteem, isolation, hampered

communication and can besource of frustration to patients and caregivers (Hockstein et al., 2004; Scully et al., 2009; Mier et al., 2000; Bavikatte et al., 2012).

Drooling can be a potential hazard during dental treatment, which requires considerable amount of time and co-operation from the patient. Restorative, endodontic and surgical procedures which demand meticulously clean field of operation, sialorrhea can be very discomforting. Sialorrhea can cause significant problems in various phases of denture fabrication as well as in its wearing. Until the patient gets accustomed to the new dentures there is further aggravation of sialorrhea due to the new dentures. Special consideration is needed to be exercised during dental treatment of pediatric patients suffering from sialorrhea. Sialorrhea may pose a huge restriction during the initial phases of orthodontic treatment wherein attachment of bands and brackets are required; also orthodontic appliance can itself act as a foreign body further aggravating it. Hence it is essential for the dental professionals to be aware of this condition, its causes and its management.

Etiology

Drooling or sialorrhea can occur as a result of hypersalivation, oral muscle incoordination or swallowing defect (Boros and Keszler, 2006; Sochaniwskyj et al., 1986). Physiological causes of drooling can be pregnancy, emotional outbursts (Leung and Pion Kao, 1999), whereas pathological causes of drooling include drug induced such as clozapine, pilocarpine, cevimeline, ketamine, and potassium chlorate, etc. (Leung and Pion Kao, 1999); local irritation in the oral cavity which could be due to denture, orthodontic appliance, apthous ulcers, etc.; neurological disorders such ascerebral palsy (Sochaniwskyj et al., 1986), parkinsons disease (Chou et al., 2007), motor neuron disease (Young et al., 2011; Lakraj et al., 2013), Down syndrome and mental retardation (Leung and Pion Kao, 1999); anatomical abnormalities as seen in developmental conditions (Leung and Pion Kao, 1999), major surgeries, oral cancer (Olsen and Sjogren, 1999); idiopathic (Boros andKeszler, 2006); gastrointestinal disease such as gastroesophageal reflux disorder, obstructive esophagitis (Leung and Pion Kao, 1999); toxis (Bavikatte et al., 2012; Freudenreich, 2005) such as pestitides, capsaicin, iron, mercury, lead etc.

Causes of drooling can be
• Physiological in pregnancy • Drug induced • Local irritation in the oral cavity • Neurological disorders • Anatomical abnormalities • Idiopathic • Gastrointestinal disease • Toxicity

Assessment

In order to treat drooling, it is very essential to assess its cause, severity etc. On an average, daily stimulated and unstimulated salivary secretion is 1.5 and 0.3 ml/min in a healthy normal individual, however, it depends on age and gender of a person (Scully et al., 2009).Assessment of drooling begins with detailed history taking pertaining to various issues which might cause sialorrhea. Comprehensive examination of the patient with respect to competency of oral sphincter, swallowing efficiency and neuromuscular coordination; salivary glands and their secretion; positioning of head and mandible; dentition and occlusion; surrounding skin of face, neck and chest exposed to saliva; mouth breathing; tongue thrusting and evidence of nasal obstruction etc. should be carried out (Harris and Purdy, 1987; Scully et al., 2009). Measurement of saliva spill can be used to quantify the amount of drooling. Counting the number of bibs or clothing soiled per day or intraoral pooling devices such as intraoral suction hook, external collection devices, etc. and can be used in the assessment as well as evaluation of treatment responses. Further, various investigations such as conventional radiography, barium swallow imaging, salivary gland imaging, computed tomography, magnetic resonance imaging might be warranted based on the cause of drooling (Bavikatte et al., 2012).

In order to assess the frequency and severity of drooling various instruments were proposed. Drooling can be graded on 1-5 point scale as dry, mild, moderate, severe and profuse respectively based on its severity, and on a 1-4 point scale as never, occasionally, frequently and constantly drools based on frequency (Hockstein et al., 2004; Bavikatte et al., 2012).Visual analog scale can also be used for assessing severity, with 1 and 10 being mild and severest form of drooling respectively (Bavikatte et al., 2012). Reid et al (2009) tested a 10 point drooling impact scale among 80 children with developmental disabilities and reported that it is valid and subjective measure.

Management

Despite the existence of treatment options, management of sialorrhea poses a serious challenge. Treatment options for sialorrhea span from conservative approaches to more aggressive treatment choices. Conservative treatment options include modifications in diet or prescribed medications, oral muscleexercises, intraoral training devices, behavior modifications, biofeedback, speech therapy etc (Hockstein et al., 2004; Lakraj et al., 2013; Reid et al., 2010; Sochaniwskyj et al., 1986).However, responses to these treatment options are variable and more time consuming (Lakraj et al., 2013).More aggressive treatment options include medications such as botulinum toxin, anticholinergic drugs, etc., acupuncture, surgery or radiation therapy (Sochaniwskyj et al., 1986).

Various pharmacological agents such as anticholinergic agents, botulinum toxin can be used, however they are associated with many side effects (Bavikatte et al., 2012; Hockstein et al., 2004; Reddihough et al., 2011). Salivary secretion is mainly under control of parasympathetic nervous system wherein acetylcholine is the neurotransmitter (Reddihough et al., 2011). Hence anticholinergic agents such as glycopyrrolate, benztropine, scopolamine etc. can be used to control salivary secretion (Reddihough et al., 2011). Mier et al (2000) reported that glycopyrrolate is effective in the control of excessive salivation in children with developmental disabilities; they pointed that 20% of the patients however developed significant side effects which needed drug to be discontinued. Mato et al (2010) concluded from their investigation that in severely disabled patients, scopolamine can be useful to control drooling; however cautioned that appropriate patient selection is important and is not free from adverse effects.

Botulinum toxin is a potent neurotoxin which blocks acetyl choline and other neurotransmitters (Lakraj et al., 2013). Manrique (2005) reported that local application of botox over the salivary glands reduced sialorrhea. Jeung et al (2012) reported that ultrasonography-guided botulinum toxin A injection into the salivary glands was a safe and effective method to treat sialorrhea in children with neurologic disorders.

Wong et al (2001) studied the efficacy of tongue acupuncture in children with neurological disabilities suffering from drooling. Authors commented that tongue acupuncture is an alternative or adjunctive treatment option prior to subjecting the patient to more invasive treatment options.

Various surgical techniques have been proposed for the management of drooling. Wilkie proposed rerouting of the parotid ducts to tonsillar pillars while Brody suggested that submandibular salivary gland resection for further control of drooling which is together known as Wilkie and Brody procedure (Harris and Purdy, 1987; Scully et al., 2009).Parotid duct ligation along with excision of submandibular salivary gland was proposed which was associated with complications of facial swelling and pain (Harris and Purdy, 1987; Scully et al., 2009). Transtympanic neurectomy was also considered, however it was associated with several serious complications such as otitis media and loss of taste (Harris and Purdy, 1987).Radiation is rarely used in cases of elderly patients who cannot withstand medications or surgery (Lakraj et al., 2013). Although aggressive treatment options provide better solution than the conservative approaches, they are not free of side effects (Lakraj et al., 2013).

In cases of mild sialorrhea, local measures such as rubber dam, cotton rolls, high vacuum suction devices, etc can be used to control drooling and provide clean field of operation during dental treatment. However in cases of severe drooling, aforementioned treatment options have to exercised in order to control drooling along with the local measures.

Conclusion

Although hypersalivation is not as common as xerostomia, it can cause significant inconvenience to patients and their care givers, especially during dental treatment. Various causes have been implicated in the occurrence of sialorrhea. Hence, it is essential to identify such causes, either local or systemic, in order to appropriately manage drooling. Primary mode of management should include conservative approaches, while the aggressive treatment options are reserved for more resistant patients.

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