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Chapter

Maxillofacial and Oral Aspects of Dysphagia

Mohammed Basha

Abstract

Oral cavity/mouth is first recipient of food. Food is broken down and prepared for initial phases of digestion. The oral preparatory phase is voluntary. In this phase, food is manipulated by the tongue and teeth. A bolus which is ready to swallow is prepared. Any disruption of oral cavity functions commonly due to oral infections, space infections, facial trauma, congenital-cleft lip and palate, temporo-mandibular joint disorders, salivary gland pathology, oral cancers, radiation therapy, etc., can cause dysphagia. In this chapter, we would explain the maxillofacial and oral aspects of dysphagia along with diagnosis and treatment aspects.

Keywords: oral dysphagia, maxillofacial dysphagia, bolus, saliva, tongue, oral infections

1. Introduction

Facial structures and its functions are very precise and rhythmic, well-orchestrated co-ordination between various structures to achieve multiple goal at the same time. Innumerous central control of voluntary and involuntary function have been studied and documented in many forms of medical literatures. Multiple facial hard and soft tissues, nerves, muscles etc., function in a very unique and well balanced way. The extremely complex process of act of swallowing/deglutition, involves approximately 50 pairs of muscles and nerves that are responsible for preparing and transferring food and liquids from the mouth to the stomach [1]. Due to the close proximity of the pathways of swallowing and respiration, precise coordination between these functions is vital in order to avoid entry of material into the airway [2]. A problem with any of these structures can lead to dysphagia [1].

Patients with pathology in oral cavity often seek treatment for that particular sign and symptoms and there by dysphagia can be easily missed. Even though disorders of swallowing are very common and, when looked for, occur regularly in most branches of surgery. Most common cause of dysphagia is a neurological disturbance [3]. Surgeons/physicians must look for presence of a second pathology affecting their swallow and plan treatment accordingly.

2. Anatomy of oral cavity - selected aspects

The oral cavity, the pharynx, and the larynx are the three anatomically and functionally separate aero-digestive tract structures which form the swallowing apparatus. Normal deglutition requires precise coordination of these structures [4–7].

A hydrodynamic pump is created with valves by these structures that allow food and liquid to be transferred into the stomach without aspiration [4, 6]. Swallowing comprise of three phases, based on the location of the bolus in the swallowing framework. Oral phase is voluntary and it set off involuntary pharyngeal and esophageal phases [4–6]. Large number of diseases causes symptoms of dysphagia affecting the quality of life of patients [6]. Understanding of the anatomy and physiology of deglutition is required to treat dysphagia.

The oral cavity inlet is guarded by the upper and lower lips. The other units of the mouth are cheeks, maxillary and mandibular teeth, gums and periodontium and periodontal ligaments, hard and soft palate, tongue and floor of mouth. The oral phase of swallowing occurs in the oral region. Masticatory performance is defined as the percentage of particle size distribution of food when chewed for a given number of strokes [8]. This evaluates the quality of chewing. Masticatory performance reflects the capacity to reduce the size of food particles and the number of chews necessary to render food ready for swallowing [9, 10]. Quality of mastication performance is affected by multiple factors like number of teeth in functional occlusion [11–13], biting force [14], dentures [15], Implants and or artificial prosthesis and salivary flow rate – which declines(masticatory performance) with a reduction of salivary secretion [16]. Bolus preparation happens between upper arch (maxillary arch) and lower arch (mandibular arch). Oral cavity transforms into oropharynx posteriorly.

Upper and lower Lips form a sphincter using the orbicularis oris muscle. Intraorally the lips have labial mucosa (mucous membrane), which extends laterally on the inner surface of bilateral cheeks as buccal mucosa. Cheeks contain the buccinator muscles and the buccal fat pads. Palate anteriorly is hard palate formed by fusion the palatine process of both maxillae anteriorly and horizontal plates of palatine bone fused at transverse palatal suture. The soft palate is located posteriorly. Anteriorly, it is continuous with the hard palate and with palatine aponeurosis. The posterior border of the soft palate is free, and has a central process that hangs from midline known as uvula. The soft palate is mobile, and comprised of muscle fibers covered by mucous membrane. The soft palate continues laterally with palatoglossal and palatopharyngeal folds, which joins the tongue and pharynx respectively [17].

3. Oral clinical conditions for dysphagia and treatment aspects

Patients with pathology in oral cavity often seek treatment for that particular sign and symptoms. Dysphagia can be easily missed. These conditions can be congenital or acquired.

Congenital conditions which are most commonly encountered in our practice are facial clefts; cleft lip and palate. There are always lots of emotions and expectations of parents during treatment. Feeding in the cleft lip and palate setting is the main challenge for the parents, pediatricians, surgeons and nurses. In a study, 97% of parents of cleft infants thought to discuss feeding challenges, 95% thought it was important to have a demonstration of feeding [18]. Poor oral suction, inadequate volume intake, lengthy feeding time, nasal regurgitation, excessive air intake, and coughing or choking are the feeding challenges [10]. The anatomic-structural deformities of cleft infants usually affect the oral phase of the suck-swallow-breathing mechanism. Cleft with syndrome, the risk of poor feeding is 15 times more [19].

The importance of adequate nutrition in cleft patients care is indispensable especially during presurgical and postsurgical period. In cleft palate patients, the ability to secure adequate seal and suction is remarkably reduced [20]. Poor intake abilities and diminished sucking efficiency causes the cleft baby with reduced oral intake, reduced weight gain and inadequate growth [21] (**Figure 1**).

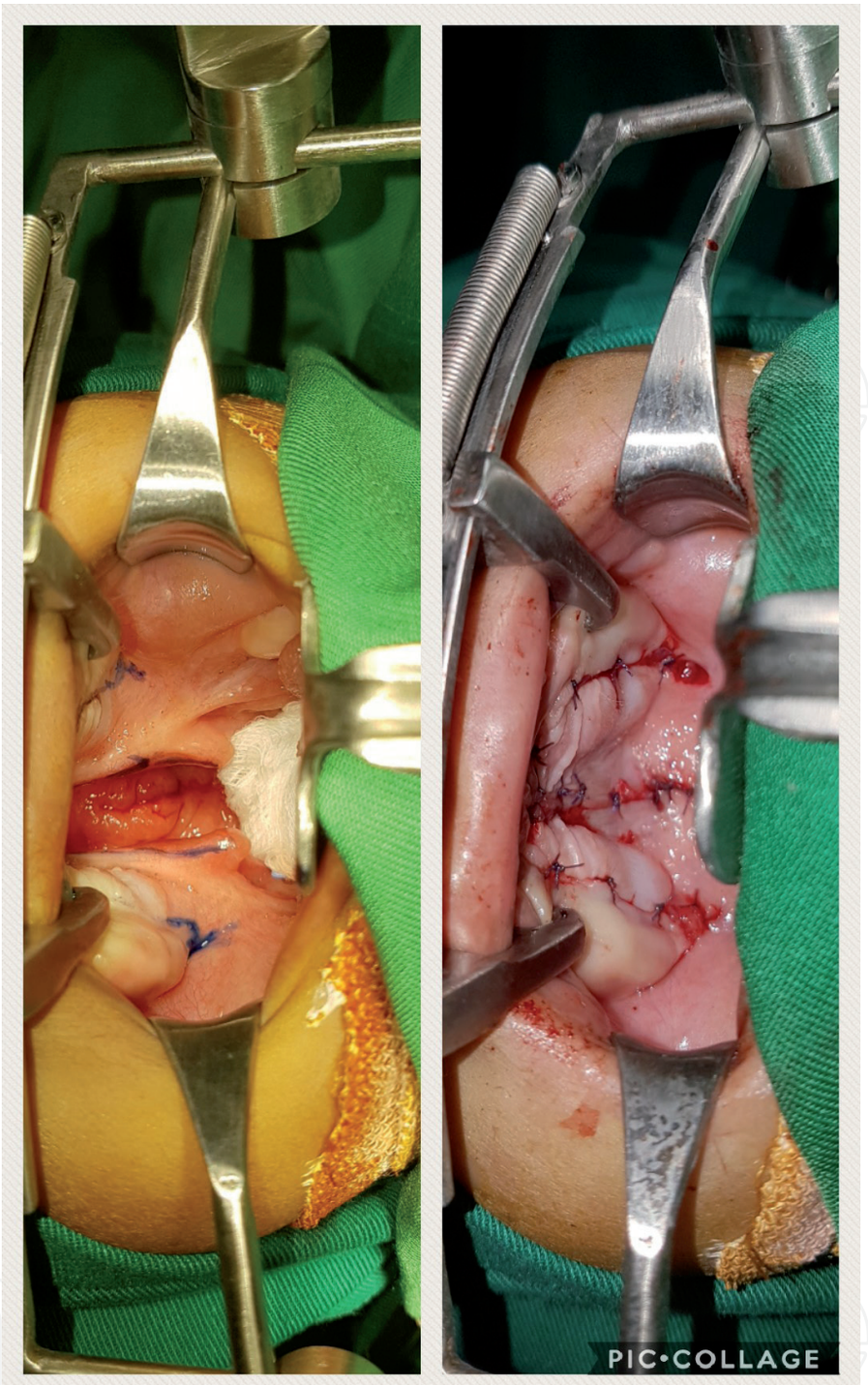


Figure 1.
Cleft of the palate pre- and postsurgery.

Bottles commonly used for feeding infants with cleft deformities include the Cleft Palate Nurser, Mead Johnson LLC, Glenview, IL; Medela Special Needs Feeder, Pigeon Bottle and vented bottles such as the Dr. Brown Bottle [22].

Post-surgery the parent face fresh challenges for feeding. Feeding protocols during post-surgery phase is contentious subject among surgeons. Surgeons recommend 3–5 days of bottle holiday, they recommend syringe feeding. Various studies bespeak that the mechanical effect of feeding have little effect on wound complications or incision breakdown [23–26].

A research conducted by Al Hadadi and colleagues showed that aspiration pneumonia was diagnosed in 15.8% of all Cleft palate babies, which was analogous to a study from Malaysia whose results were 14% [27, 28]. The reason for high incidence

of aspiration pneumonia in orofacial cleft is malfunctioning of the palatal muscles and cleft of the palate leading to difficult swallowing and aspiration. It is also been reported that the hyoid bone is abnormal in cleft patients [29].

4. Acquired causes for oral dysphagia

Oral health is defined as "a state of being free from chronic mouth and facial pain, oral and throat cancer, oral infection and sores, periodontal(gum) disease, tooth decay, tooth loss, and other diseases and disorders that limit an individual's capacity in biting, chewing, smiling, speaking, and psychosocial wellbeing" [30]. According to the World Health Organization dental caries and periodontal diseases have high prevalent rate of nearly 100 and 90% respectively. Aspiration pneumonia in the medically compromised and elderly, and post-operative infections can be prevented by proper oral health and hygiene [31–33].

Loss of tooth will disturb the pattern of pre- swallow and swallowing behaviors. Especially with older individual with loss of multiple teeth find it onerous in chewing and swallowing [34]. Chewing ability directly depends on remaining functional teeth with functional occlusion [11–13].

Oral preparatory stage which is affected the most due to loss of teeth, as loss of tooth diminish chewing ability and causes difficulties in forming the bolus. Bolus size was reported to increase with an increasing number of missing teeth, with larger boluses potentially interfering with optimal swallowing [35]. An ill formed bolus may be difficult to transport smoothly and efficiently into the pharynx, thus leading to additional swallowing abnormalities.

Replacement of loss of teeth by prosthetic teeth/dentures is an effective way to increase the functional masticatory unit. Prosthetic rehabilitation to maintain appropriate mandible position with good occlusion is important in smooth swallowing in older individuals [36].

A study in which relationship between the number of teeth in function, denture use and subjective swallowing problems in a sample size of 5643 individuals aged 40–89 years concluded that individuals with fewer functional teeth or no denture use were likely to have subjective swallowing problems, and suggested that, even if people have few teeth, denture wearing contributes to prevention of swallowing problems [34].

An extensive study conducted in 289 elderly people aged 60 years and older, to evaluate the relationship between the number of teeth, denture wearing, and swallowing by a noninvasive cervical auscultation technique. They concluded that 31.1% had swallowing impairment. About 20% of patients had swallowing impairment in subjects with 20 or more teeth with denture whereas subjects with 20 or more teeth without dentures had swallowing impairment by 26.5%. Swallowing impairment was found in 38.9% in less than 19 teeth without prosthesis. About 57.7% had swallowing impairment with less than nine teeth without dentures. And, 66.7% completely edentulous patients without dentures had difficulty in swallowing, whereas it was to be 28.7% with complete denture prosthesis [37].

Researcher have found that there was higher frequency of entry of secretions, food/liquid, or any foreign material into the laryngeal vestibule above the level of the true vocal folds (laryngeal penetration) in edentulous elderly people who are not wearing any denture prosthesis, but laryngeal penetration was reduced in edentulous elderly people when wearing dentures [38].

The precision fit of dentures has positive effect on the swallowing function. Wearing ill-fitting dentures, particularly in the case of a complete denture, may interfere with achieving sufficient occlusal contact. Insufficient occlusal contact

reduces masticatory performance and causes impairment of swallowing activity. In a study which shows ill-fitting dentures increases duration of swallowing in elderly patients using electromyography. Normal swallowing duration form 12 to 70 years age person ranges between 0.80 and 1.60 s. They claimed that in ill-fitting poor prosthesis the swallowing time was 1.84 s and the time was reduced to 1.28 s in well-fitting prosthesis. The quality and fit of prosthesis plays a vital role to improve swallowing ability in elderly individuals [39]. By repairing or relining ill-fitting dentures showed the pharyngeal transit time was shorter when compared to not wearers. Increase of pharyngeal transit time increases the risk of aspiration [40]. A person who has inadequate natural masticatory teeth and are without wearing dentures had a 91% greater risk of dementia than those with adequate natural mastication [41].

Dry mouth or xerostomia is a condition which results in dryness of mouth due to decrease in saliva secretion. It is common in elderly population and has an incidence of 20–60% [42]. Xerostomia affects the oral preparatory and oral phases of swallowing, causes impaired bolus formation and transport [43]. Swallowing disorders in xerostomia can be managed with oral moisturizers, lubricants, and careful use of fluids during eating [44]. It is considered that tooth brushing helps to improve oral hygiene and increased salivary flow rate. Mechanical stimulation of the salivary glands during tooth brushing can promote the discharge of saliva [45]. Tooth brushing may activate impulses to both major and minor salivary tissues following stimulation of oral and pharyngeal regions, causing salivation [46]. In a study by Papas and colleagues showed that tooth brushing increased salivary flow in people with medication-induced dry mouth [46]. Another study stated that elderly people with tooth brushing frequency less than twice per day were more likely to have dry mouth [45].

Hyper salivation may produce swallowing problems caused by aspiration of saliva. It's induced by inflammations of oral cavity, Parkinson's disease, epilepsy, or medicine such as pilocarpine and cholinesterase. Neurological disorders cause excessive pooling of saliva in oral cavity, with unintentional loss of saliva from mouth – drooling of saliva [47]. Drooling impair masticatory function and can cause aspiration.

Infections from the teeth are referred as odontogenic infections; these are very common in dental and maxillofacial practice. These infections can be simple/localized or can become very aggressive involving spaces of neck and deep neck region [48]. Flynn showed that fever, swelling, dysphagia and trismus (**Figure 2**) were the symptoms most commonly observed in patients hospitalized for odontogenic infection [49].

Deep neck space infections can spread along the facial spaces of the head and neck, inducing life-threatening deep space infection associated with a high risk of complications (upper airway obstruction, mediastinitis, thoracic empyema, pericarditis, septic shock) [50–53] (**Figure 3**). Neck spaces communicate with one another, results in spread of infection over larger area. Neck spaces consist of loose connective tissue between the deep cervical fascia (superficial, middle and deep) [54].

Ludwig's angina is an aggressive infection of facial and deep neck spaces, often of dental origin, characterized by a rapid spread of cellulitis in the submandibular and sublingual spaces [55] (**Figure 4**). It was described by Karl Friedrich Wilhelm von Ludwig in 1836 [56]. The origin of Ludwig's angina is odontogenic in 90% of cases, males are more commonly affected than females, and associated teeth are usually mandible molars- second and third molars [57–59]. The dental roots of these teeth usually lie below the mylohyoid ridge, infection from these teeth spread directly into the submaxillary spaces. With all the spaces which are well connected there is continuous spread of infection in sublingual space, pharyngeal and retropharyngeal spaces of neck [60].



Figure 2.
Severe trismus in oral and neck infection.



Figure 3.
Thoracotomy for descending oral infection and mediastinitis and empyema.

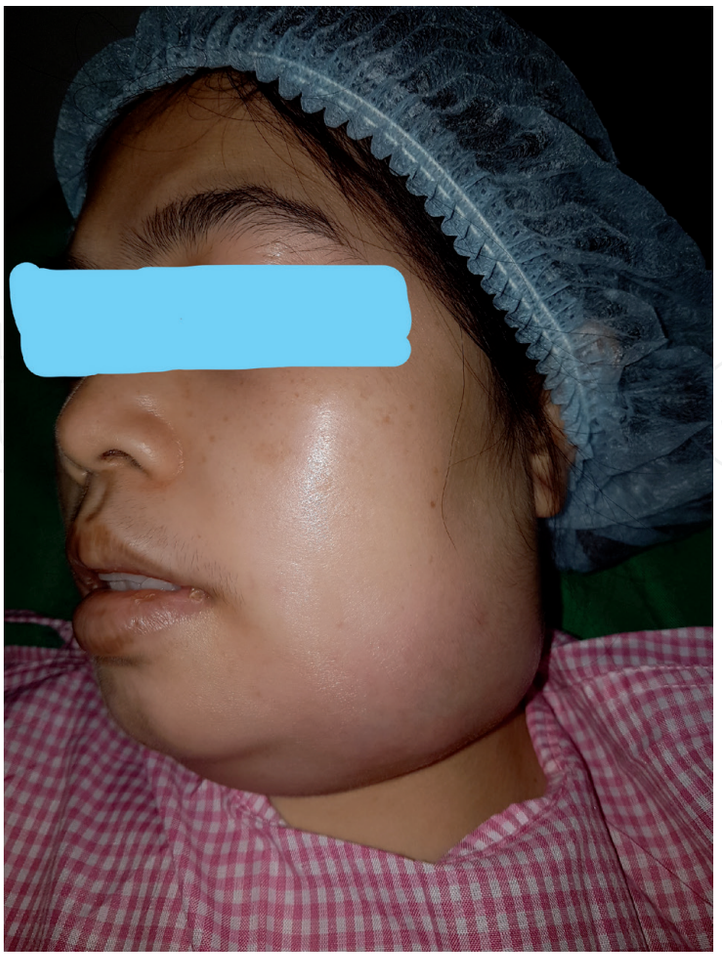


Figure 4.
A case of submandibular and neck space infection.

Patients with active or chronic oral/dental infections, poor oral care, medically compromised conditions like uncontrolled diabetes mellitus, malnutrition, drug abuser, AIDS, immunosuppression are highly susceptible for developing space infections. Ludwig's in Children can occur without any predisposing condition [60].

Clinical features have bilateral suprahyoid swelling, hard indurated cardboard-like consistency. It is non-fluctuating and tender on palpation. The mouth is open and the tongue is raised and is in contact with the palate. Patient has dysphagia, drooling of saliva, and breathing/airway obstruction, which are the most salient presenting. Signs and symptoms of the illness depend on the spaces involved, and include pain, fever, malaise, fatigue, swelling, odynophagia, dysphagia, trismus, dysphonia, otalgia, and dyspnea which are due to cellulitis, aided by the awkwardness resulting from the position of the tongue [61]. Redness is usually seen on skin in area front of the neck (**Figure 5**). The diagnosis in patients with Ludwig's angina is based on clinical findings. Panoramic radiography can help to discover the origin of the dental infection, while a cervico-thoracic CT scan with contrast is diagnostic (**Figure 6**). Ludwig's angina is potentially fatal, and its mortality rate can reach up to 50% [60] if not treated timely. Streptococci, Peptostreptococcus species, *Staphylococcus aureus*, and anaerobes are the most commonly cultured organisms from space infections [61]. The odontogenic infections that may cause Ludwig's angina can largely be prevented by timely interventions and periodic dental care.

Ludwig's angina can cause life threatening complications of airway obstruction, which is an acute emergency. Descend of infection into deeper plane can cause mediastinitis, pleural empyema, thrombosis of jugular vein, pericarditis, generalize sepsis and bacteremia, hematogenous dissemination to distant organs, DIC [62, 63].

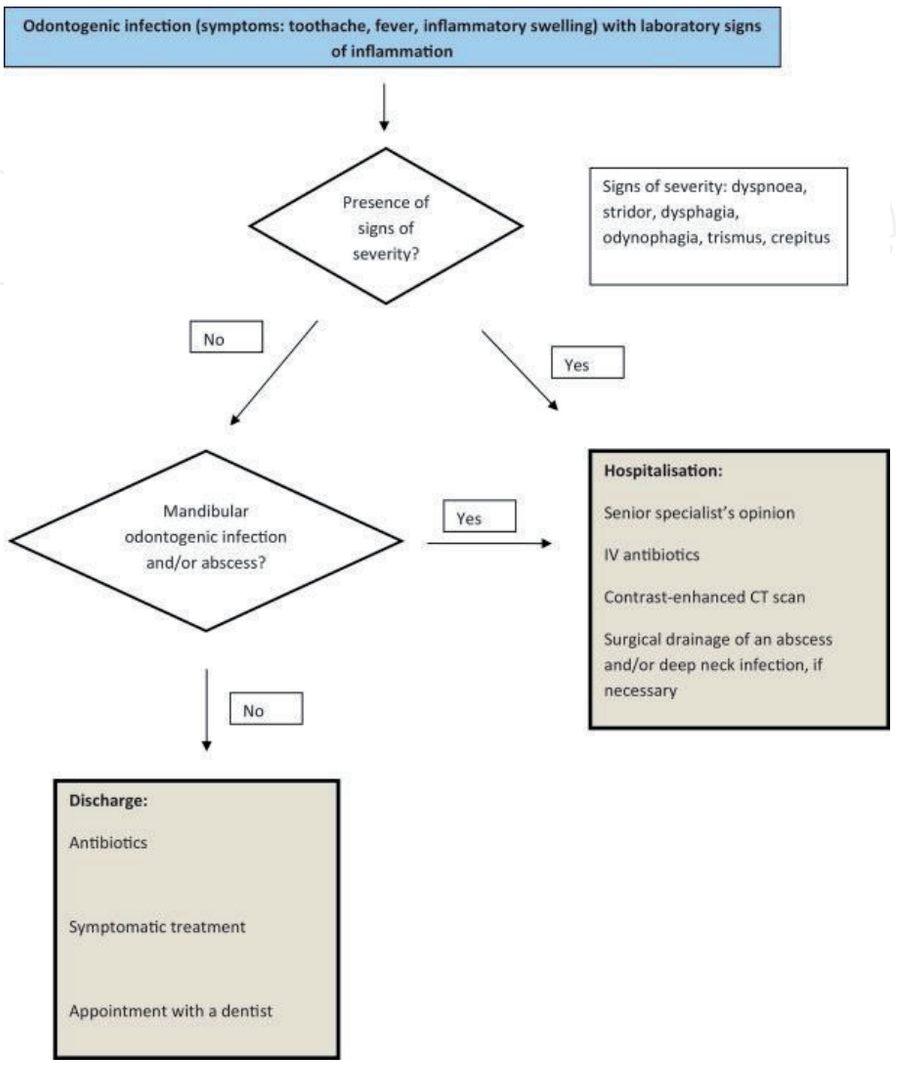


Figure 5.
Deep neck infection with cellulitis.



Figure 6.
CT showing neck abscess with tracheal deviation to opposite side.

Antibiotics, airway management, surgical drainage remains the key in its management. In life saving conditions, airway protection, emergency surgical drainage of the abscess followed by antibiotics, proper diagnosis and its management is the key to managing deep neck space infections (**Figure** 7).



Flow chart for patients with odontogenic infection attending the emergency department- taken from the work of AlOtaibi and companions [48].

Acute necrotizing ulcerative gingivitis (ANUG), or Vincent's infection, or trench mouth is a disease affecting the oral cavity which was noted in the Greek army by Xenophon. Soldiers suffered sore, ulcerated, and foul-smelling mouths. Similar occurrences were noted among soldiers in World War I who suffered severely from this condition. The disease is commonly found in young middle-aged, which is characterized by painful, hyperemic gingiva with sharply punched-out interdental papillae, gingival bleeding on gentle probing, the presence of a gray necrotic pseudo membrane, and a fetid mouth odor. Increased dysphagia, severe pain, hyper salivation, facial pain and swelling, accompanied by chills and fever. Conservative and supportive treatment measures based on good oral hygiene and aimed at eliminating causative factors usually result in marked improvement of the patient's condition within a relatively short period of time [64].

Viral Infections and its oral manifestations like Herpes simplex infections cause numerous shallow, irregular, necrotic ulcers, with surrounding edema and inflammation, widespread over the inside of both upper and lower lips, on the dorsal and ventral surfaces of the tongue, cheeks and soft and hard palate. Usually, the ulcers are extremely painful to touch. Patient complains of severe pain on eating, chewing and swallowing.

Recurrent aphthous stomatitis (RAS) can be defined as a recurrent oral necrotizing ulceration, the etiology of which remains obscure. Mikulicz and Kummell first described the chronic recurrent nature of this disease. In 1911, Sutton described a more severe form of RAS as periadenitis mucosa necrotica recurrens. At present, the disorder is more simply referred to as mild and severe aphthous or minor and major recurrent aphthous ulcers. In 1937, Behcet described a mucocutaneous-ocular syndrome that now bears his name and is characterized by a triad of symptoms-recurrent oral ulcerations, recurrent genital ulcerations, and ocular inflammation. All these diseases cause oral ulcerations, where in the patients modify their oral intake just to avoid pain. If ulcers on posterior tongue, oropharynx regions, these



Figure 7.
Neck infection: pre surgery, with drains, post treatment.

cause severe dysphagia (**Figure 8**). Treatment options include tropical steroids oral pastes, steroids, Vitamin C, immune suppressants based on clinical features, severity and clinicians treatment protocol [65].

Salivary gland pathology also contributes for dysphagia. Most common salivary gland pathology causing symptoms of dysphagia encountered in practice are ranula which occurs in the floor of mouth. Ranula is an extravasation cyst and may develop from extravasation of mucus after trauma to the sublingual gland (**Figure 9**) and rarely submandibular gland or obstruction of salivary ducts [66]. The lesion forms due to extravasation of mucus and subsequent formation of a pseudocyst. It is characteristically large (>2 cm) and most reported ranulas are 4–10 cm in size and rarely bigger than 10 cm [67]. When ranula becomes larger, it acquires a blue color



Figure 8.
Oral ulcers: pre and post treatment.



Figure 9.
In oral ranula.

and resemble frog's belly. Big sized ranulas may cause deviation of the tongue with associated difficulties in speech, swallowing and mastication [68]. It commonly occurs in the second and third decades of life and the reported male to female ratio is 1:1.3. The most common factor is that trauma causes direct damage to the duct of the sublingual gland [69]. Treatment option most commonly used is surgical removal of the lesion along with the involved salivary gland.

Bleeding in floor of mouth following trauma causes rapid elevation/enlargement of the tongue secondary to sublingual hematoma can cause life-threatening airway obstruction, necessitating prompt recognition and management of this condition [70]. Etiology of traumatic lingual hematomas include: motor vehicle accidents associated with mandible fractures, assault, child abuse, and seizures. Spontaneous lingual hematomas are usually a result of an inherited coagulopathy or patients on anticoagulant treatment [71–74]. Clinical signs of sublingual or lingual hematoma may include mass like swelling, hematoma, dyspnea, stridor, dysphagia and dysphonia. Tongue enlargement causing upper airway obstruction as it is displaced posterior-superiorly. Securing the airway is the first most important step in the management of these patients. Once airway is secured, hemostasis is focused at based on the primary cause. Treatment options include observation, airway control, steroids, antibiotics, reversal of any coagulopathy, embolization and surgical intervention. Surgical intervention becomes necessary in instances where embolization is unavailable or unsuccessful. This most commonly entails extra-oral ligation of the lingual artery and which requires a detailed understanding of the involved anatomy. Being able to recognize the initial presentation, underlying cause and relevant anatomy of lingual hematomas is critical to the proper management and treatment of this condition [75].

Sublingual hematoma caused by Placement of dental implants in the anterior mandible has been reported. Dental implants placement is a routine procedure done in outpatient departments of dental clinics. Endosseous dental implants placed in canine-premolar region have caused severe bleeding in the loose tissues of the floor of the mouth, the sublingual area and the space between the lingual muscles. Lingual surface of mandible is very vascular. There is rich anastomoses sublingual branch of the lingual artery which anastomoses with the submental artery, a branch of the facial artery, and the incisive arteries, branches of the inferior alveolar artery. Plexus lies very close to the interforaminal lingual cortical plate of the mandible and severe hemorrhage from this region has been reported as a complication of implant

placement and other surgical procedures. Many unnamed accessory foramina on the lingual surface of mandible have been reported after anatomical studies by Hofschneider et al., 1999, McDonnel et al., 1994, Loukas et al., 2008. Formation of a hematoma in the floor of the mouth cause tongue getting pushed up, difficulty in swallowing, dysphagia and acute airway obstruction which may require emergent airway protection via intubation or tracheostomy. Accurate preoperative assessment mandible lingual surface with the help of dental CT/cone beam CT and accurate determination of implant length, avoiding lingual perforation, close post-operative follow up is recommended to prevent this complication [76].

Severe Maxillofacial (**Figure 10**), neck injuries and dysphagia are well-established complication especially in polytrauma admitted to intensive care unit. Incidence of maxillofacial injuries in polytraumatised patients is relatively high (25.4%) [77]. Approximately 35% are primarily affected by complex midfacial fractures. Every 13th polytrauma patient (7.7%) presents a spinal cord injury with neurologic deficit [78]. The risk for pulmonary aspiration is very high in these

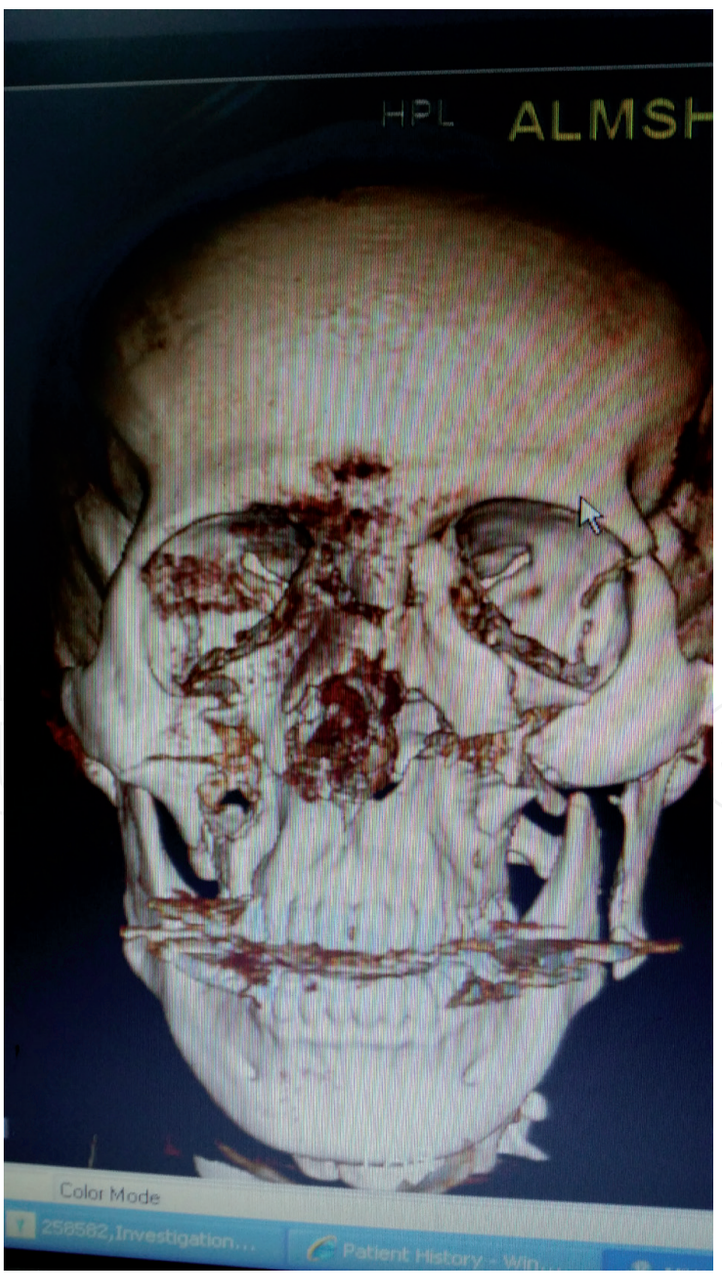


Figure 10.
Pan facial fracture.

patients, which is a leading cause of pneumonia [79], prolong hospitalization and increase mortality rates. High-energy trauma may result in some uncommon types of mandibular fracture, which cause the bony framework to destabilize (flail mandible) (**Figure 11**), and lead to partial or complete occlusion of the oropharyngeal inlet. Bilateral mandible fracture especially involving the parasymphyseal region causing airway obstruction and glossoptosis is known as flail mandible fracture. The mandibular deformity caused by bilateral parasymphyseal fracture usually displacing the fractured mandible posteriorly making the "Andy Gump" face appearance; a face with deficient chin. Airway obstruction can also occur due to loose teeth dislodgement as a result of impact/trauma, foreign bodies such as oral prosthesis, hematomas of the sublingual and nasopharyngeal region [80]. Fractures of parasymphyseal region cause lack of bony continuity which further causes collapse of the genioglossus and intrinsic tongue muscles into the oropharynx. Reestablishment of a patient airway is most important aspect. Emergency reduction of the fracture fragments and temporary stabilization of fracture fragments with the help of bridal wire, anterior traction of tongue with sutures to relieve airway, using oropharyngeal or nasopharyngeal airway, or by endotracheal tube according to the condition and situation of patient. Tracheotomy can always come handy for emergencies in which airway establishment is difficult.

Zachariades reported a rare case of Laryngeal Incompetence Following Facial Trauma. Patient was diagnosed having Le Fort I type of fracture, bilateral fractures of the mandibular condyles, and a comminuted fracture of the symphysis. Patient experienced respiratory difficulty that was alleviated when the mandible was pulled forward. Tracheostomy was done, followed by maxillomandibular fixation. Post

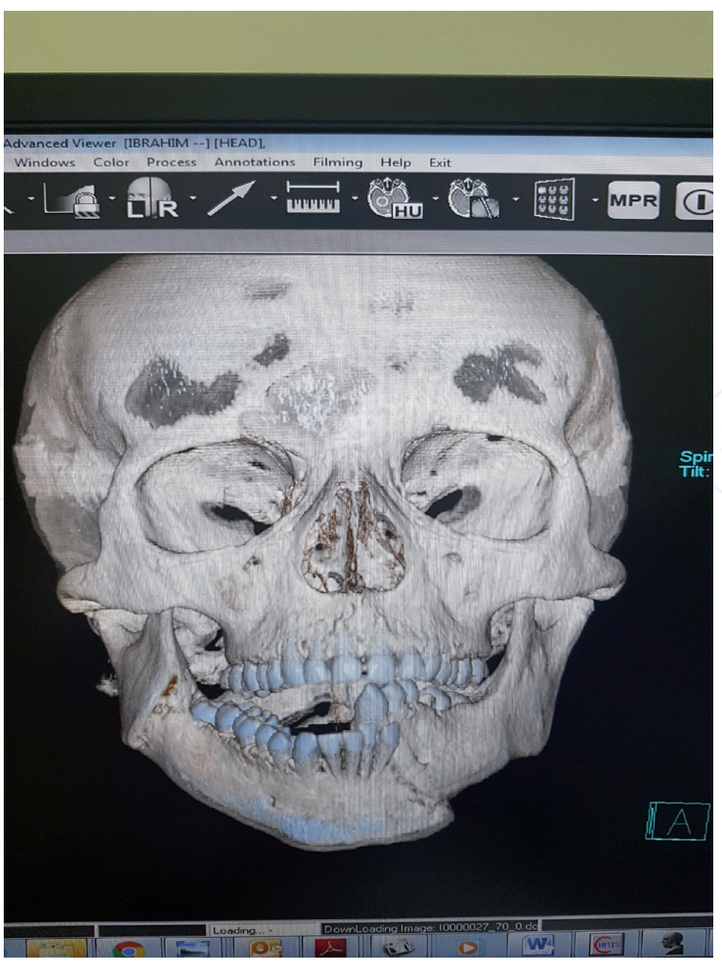


Figure 11.
Flail unstable mandible fracture.

operatively nasogastric feeding for 2 days. When the patient was given liquids orally, he would cough; leak was noted around the tracheostomy site. Initial diagnosis of perforation of the esophagus and esophageal-tracheal communication was suspected.

Barium swallow were performed and there was no esophageal-tracheal communication. They diagnosed the condition as laryngeal incompetence. Patient was subsequently sustained on intravenous fluids and Nasogastric feeding. The tracheostomy was kept open throughout the entire period of fixation. When fixation was released after 22 days, they found that laryngeal incompetence had almost completely vanished. The author discusses the reasons for laryngeal incompetence were tracheostomy, general anesthesia administration through tracheostomy, endotracheal cuff, overextension of head during reduction and wiring fractures [81].

A detail prospective evaluation study was conducted by Tiwary and companions on maxilla-facial trauma and associated Styloid process fractures, they found that in 84 patients with road traffic accident causing maxillofacial trauma, 27 patients had styloid process fracture. In maxillofacial fractures: mandible and multiple facial fractures were associated with styloid process deformity. Their results were Styloid process fracture with mandibular fracture was found in 52%. Clinically patients have dysphagia, dull ache in the throat, trismus, foreign body sensation, restricted lateral mandible movement, pain on turning the head to one side, otalgia, tinnitus, and tenderness to palpation of the tonsillar fossa and retromandibular regions. Management includes soft diet, analgesics and muscle relaxants as conservative therapy. Surgical excision of the distal portion of the fractured process is indicated when the patient's symptoms do not subside within a reasonable period of time [82].

Tumors located in the mouth and oropharynx are associated with dysphagia and poor swallowing function, exerting a negative impact on the quality of life of patients who have undergone resective/reconstructive surgery with or without radiotherapy for the treatment of head and neck cancer [83].

Cancer of the lips, oral cavity, oropharynx, hypopharynx, larynx, and esophagus is the fifth most common form of cancer in the world [84, 85].

Dysphagia is a common and debilitating complication of head and neck cancers (HNC), and its treatment places substantial physical and psychosocial burdens on patients [86].

Dysphagia in HNC cripples the quality of life and It can also cause life-threatening complications like aspiration pneumonia [87].

Klingelhöffe and companions in there research have stated that 98% of their patients had a swallowing impairment, and in that 10.2% patients who were unable to swallow. The size of tumor, nodal stage, reconstruction by flap and poor dental status strongly contribute to swallowing impairment. There was an increase in swallowing difficulty in patient with T2 than T1, closure with flap reconstruction over primary closure patients [87].

Chen and companions in their research have claimed that, their patients had difficulty in swallowing dry foods, hard food, and dysphagia was interfering with enjoyment or Quality Of Life (QOL). Patients with tumors of the tongue and buccal cancer had worse functional dysphagia QOL. Buccal cancer also has worse overall dysphagia QOL, functional dysphagia QOL, and physical dysphagia QOL. Emotional dysphagia QOL was associated with poor swallowing ability and depression [88].

Cancers of the tongue are associated with swallowing difficulty in all the phases of swallowing. In a study by Huang and colleagues, they found that there was restriction in tongue movement, with a delay in oral transit time, decreased hyoid bone elevation, aspiration was noted in many, vallecula epiglottica, and residual material in the pyriform sinuses were observed post-surgery. Patient with tongue cancer were associated to have higher incidence of silent aspirations, with

no symptoms, this is dangerous condition that may cause pneumonia and even loss of life [89].

Dysphagia treatment or management for postoperative cancer patients is multistep and complex in nature. There is involvement of Stomatology surgeons, radiation and medical oncologists, dieticians, speech pathologists, and psychologists as a team to address the issues as soon as it is suspected, identified and should be addressed [90].

5. Conclusion

Oro-pharyngeal dysphagia is always undiagnosed and underestimated as the physician/surgeon focus on the primary disease. Impact of dysphagia should not be underestimated by the surgeon. Swallowing ability and depression are the most important factors associated with dysphagia-specific health-related quality of life. Swallowing rehabilitation programs are recommended to help cope with swallowing rehabilitation and dysphagia. Oral care is of prime importance, we suggest it's important to maintain good oral habits to achieve good systemic health, as mouth is the mirror for good health. Identification of patients who are more likely to have dysphagia, an interdisciplinary preventive interventions during treatment, long-term preventive/curative interventions and aim of minimizing the negative impacts of dysphagia on the nutritional status and quality of life of patients.

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To All My Teachers, Family and Friends.

Conflict of interest

No conflicts of interest.

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