ENT-I01
3D US for Surgical Margin Assessment

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Surgical resection with adequate margins is crucial for successful surgical treatment of oral squamous cell carcinoma (SCC). Achieving margins of at least 5 mm is associated with improved local control and survival, yet close or positive margins are frequently encountered, particularly in deep tissues. In this lecture, a new 3D ultrasound technique for intraoperative ex vivo margin assessment will be presented. Further pilot data from six patients (three T1 and three T2 stages) will be presented. In this study we scanned their resected specimens using 3D ultrasound. Margin measurements (deep, medial, lateral) and tumor area were evaluated by four surgeons and compared with histopathological findings. The 3D ultrasound accurately categorized margin status in five out of six cases, with a Pearson correlation of 0.7 ($p < 0.001$), 0.6 ($p < 0.001$), and 0.3 ($p < 0.05$) for deep, medial, and lateral margins, respectively. Bland–Altman analysis for deep margins showed a mean difference of 0.7 mm (SD 1.15 mm). These findings suggest that intraoperative 3D ultrasound imaging is a promising tool for enhancing the accuracy of margin assessment, potentially increasing the rate of free margins in tongue SCC surgeries.

ENT-01
Ultrasound in Otology

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Ultrasonography is increasingly recognized for its potential in the otologic field, offering a safer and more accessible imaging alternative. Traditionally, otorhinolaryngology has relied on techniques such as the Schüller and Stenvers views, which were developed early in the history of radiology and continue to be used today. However, these methods, along with modern CT scans, have significant limitations, including restricted diagnostic capabilities and the risk of exposing patients to ionizing radiation. Although not widely used for ear imaging, ultrasonography presents a promising alternative due to its small, portable equipment and non-invasive nature, making it particularly suitable for initial patient evaluations in a clinical setting.

One of the key challenges in otology is visualizing the middle ear, especially in cases where the tympanic membrane is opaque, such as after surgery. This opacity can complicate the accurate diagnosis of middle ear pathologies, leading to potential delays or inaccuracies in treatment. Ultrasonography has the potential to address these challenges, providing otologists with a safer, more effective tool for assessing middle ear conditions. Unlike traditional radiographic methods, ultrasound does not involve exposure to harmful radiation, making it a preferable option for repeated imaging.

This meeting will thoroughly explore the current literature on the development and application of ultrasound in otology. We will discuss its role in enhancing diagnostic accuracy and potentially transforming the standard approach to ear imaging.

ENT-02
Ultrasound in Adult Obstructive Sleep Apnea

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Obstructive sleep apnea (OSA) is a prevalent sleep disorder associated with significant morbidity

and mortality. While polysomnography (PSG) is the gold standard for OSA diagnosis, it is costly. In addition, the PSG does not depict the dynamic motion of the upper airway in the settings, particularly the movement of the tongue during natural sleep. Ultrasound has emerged as a potential tool to evaluate the dynamic changes of the tongue in patients with OSA. Algorithm-driving automatic tracing and measuring the characteristics of the tongue during natural sleep may aid in OSA diagnosis and guide surgical interventions. Moreover, the symposium will explore future directions for ultrasound in OSA, such as using ultrasound neuromodulation to manage OSA and machine learning for real-time ultrasound analysis. Overall, this symposium session aims to review the current state of ultrasound in OSA and discuss future directions for its use to promote its adoption as a valuable tool for OSA diagnosis and management.

ENT-03

Application of Head and Neck Ultrasonography in the Upper Aerodigestive Tract

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Ultrasound can effectively and rapidly provide radiation-free diagnostic images and guide treatment procedures. Most parts of the head and neck are soft tissue and relatively superficial, so ultrasonography is extremely suitable for preliminary assessment and diagnosis. Based on our understanding of the anatomical structures of the head and neck, we have gradually extended the use of head and neck ultrasound to applications in the upper respiratory and digestive tracts.

Point-of-care ultrasound (POCUS) in the head and neck region plays a particularly significant role in the diagnosis and treatment of upper airway stenosis, swelling, and painful diseases in the neck, and in the evaluation of swallowing function.

The laryngeal ultrasonography could make effective diagnosis and assessment of various voice disorders and could be complementary to flexible laryngoscopy, especially when laryngoscopy is contraindicated or in children.

Unilateral vocal fold paralysis (UVFP) seriously deteriorate the quality of life and injection laryngoplasty (IL) could restore physiological and biomechanical properties of the larynx. Hyaluronic acid (HA) is one of the most commonly used materials. However, the relation between HA residue and clinical voice outcomes is undetermined. A novel AI-based ultrasonic image analysis model was developed. Ultrasonography could be incorporated in the follow-up for patient with UVFP underwent HA IL, and provides perspectives beneficial to treatment planning. On the other hand, there are limitations in current injectable materials and increasing demand for materials possessing desired injectability, bioactivity and biodegradability for reconstruction of glottal insufficiency. Small animal model for search for materials with more ideal biomechanical properties are required. We established a novel surgical model for IL utilizing ultra-high frequency ultrasonography in rats. In addition to providing visual guidance during the procedure, robust longitudinal evaluation of treatment effect was also demonstrated.

ENT-04

The Future Prospect of the Ultrasound in Otolaryngology and Head Neck Surgery：Integration of US in Oral Cancer Treatment–From Diagnosis to Surgical Reconstruction

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Ultrasonography has been incorporated into many medical fields to help clinical physicians obtain more clinical information and make accurate diagnoses since its invention in the 1990s. Although several imaging techniques such as computed tomography (CT) or magnetic resonance imaging (MRI) can provide more information around the head and neck region, ultrasonography has advantages over these techniques. It provides a dynamic and real-time assessment with excellent soft tissue discrimination, and it is free from radiation. Moreover, the costs of ultrasound examinations are far lower than CT or MRI.

The AJCC 8th edition has introduced the concept of depth of invasion (DOI) in TNM staging of oral cancer. Unfortunately, DOI is determined only by postoperative histopathological measurement, which may hinder clinicians from accurately estimating the clinical stage preoperatively and underestimate disease severity. We used ultrasonography to assess neck lymph nodes and obtain DOI in early-stage oral cavity cancer preoperatively. Additionally, we applied sonography for perforator mapping to achieve defect-oriented free flap harvesting. These applications provide clinicians with a comprehensive view of the diseases, as well as hints for surgical reconstruction after tumor ablation.

Acquiring more knowledge regarding ultrasonography helps surgeons perform timely sonogram evaluations and make accurate diagnoses and provide prompt treatment. Sonograms can be performed at the bedside, in clinics or even in the operative theater. Clinicians can provide a streamlined service and gain patients' trust with the point-of-care ultrasound.

Hereby, we report our experience and efforts in integrating ultrasound examinations in oral & maxillofacial surgery, particularly in oral cavity cancer treatment at Taipei Veterans General Hospital.

ENT-05

The Application of Ultrasound-guided Radiofrequency Ablation (RFA) in Head and Neck Tumor

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Ultrasound (US) is a cost-effective image modality that can rapidly provide radiation-free diagnostic images and guide treatment procedures. The utility of office-based ultrasound is growing in the otolaryngological department. Thermal ablation techniques are based upon the destruction of tissue in extreme hyperthermic conditions. The primary mechanism of cell death is coagulation necrosis. Due to consider the risk of surgery and post-thyroidectomy hypothyroidism, the radiofrequency ablation became a conservative modality opinion in clinical practice. Radiofrequency ablation is a promising treatment modality for various tumors, including benign thyroid nodules, recurrent thyroid papillary thyroid carcinoma and parotid tumors.

ENT-06

Development of Point-of-Care Ultrasound (POCUS) for Swallowing Assessment and Rehabilitation in Head and Neck Cancer Patients

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Cancer is the leading cause of death in Taiwan, with head and neck cancers accounting for significant morbidity and mortality. High incidence rates are linked to smoking and betel quid chewing. Our studies indicate that 52% of head and neck cancer survivors have swallowing problems, especially those with oropharyngeal cancer or who received 3D-CRT treatment. Post-treatment complications like xerostomia and thick saliva significantly affect quality of life. Aggressive speech and swallowing rehabilitation (SSR) improve survival rates and prevents weight loss. Real-time ultrasound is an effective non-invasive tool for dysphagia assessment. However, traditional ultrasound is costly and cumbersome. Point-of-care ultrasound (POCUS) is increasingly used in clinical practice, but its role in swallowing assessment and biofeedback remains unclear. This study aims to evaluate POCUS's effectiveness in assessing and rehabilitating swallowing in head and neck cancer patients.

ENT-P01

Ultrasonography of Incidental Thyroid Nodules: A Systematic Review and Meta-analysis of Prevalence

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Background: An increasing number of physicians use ultrasound (US) to evaluate the thyroid. Consequently, many individuals in the general population have been diagnosed with thyroid nodules. However, there has been no systematic review examining the prevalence of incidental thyroid nodules among asymptomatic adults or elucidating the associated factors.

Materials and Methods: We searched the MEDLINE and EMBASE databases to identify studies focused on thyroid incidentaloma observed via US.

Results: A total of 95,394 adults were enrolled, and 35,971 people were found to have thyroid incidentaloma via US. The results revealed that the prevalence of incidentaloma was 30.6% (95% CI: 26.3-36.3, I2=99%, P< 0.01). The subgroup analysis indicated that the prevalence rates of thyroid incidentaloma were 34% and 23% for females and males, respectively. The prevalence of thyroid incidentaloma was 38% and 19% for individuals aged more than 40-45 and less than 40-45 years, respectively. The prevalence of thyroid incidentaloma was 60% and 25% for high-frequency (>12 MHz) and low-frequency US, respectively. The majority of thyroid incidentalomas were smaller than one centimeter and had singular nodules.

Conclusion: According to this systematic review and meta-analysis, up to 30% of asymptomatic adults will have thyroid incidentalomas detected by US. More thyroid incidentalomas were found in women, older people and those with a higher-frequency US.

Key words: Ultrasound, thyroid nodules, incidentaloma