Infratemporal fossa ct

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Zone 2 (better interchange space)—the area, including the superior lateral head of the pterygoid muscle, V3, and cucumber ovale. Zone 3 (inferior space interpterygoid)-includes the lower lateral head of the pterygoid muscle, medial pterygoid, and temporalis muscle, and the space enclosed by these muscles. Zone 4 (temporal-masseteric space) — lateral space for the temporalis muscle (mainly comprising fat). Zone 5 (tubopharyngeal space)—includes eustachiasis, tensor, and levator veli palatini muscles, and structures in the upper parapharyngeal space. The ITF can be visualized as five zones based on spaces enclosed by chewing muscles and upper parafaryngeal structures. This novel classification system is useful for directing endoscopic approaches to ITF, while reducing the risk of damage to neural structures and pterygoid muscles. Infratemporal fossa (ITF) is an irregularly bounded anatomical space comprising the spaces of the masticator and the upper parafaryngeal spaces (UPPS) and located below the middle floor of the fossa skull.1 In turn, Masticator space includes medial and lateral pterygoid muscles, temporalis muscle tendons, internal maxillary artery, jaw (V2) and mandibular (V3) branches of the trigeminal nerve, tensor and levator veli palatini muscle and Eustachius tube.2 Styloid diaphragm, formed by styloid aponeurosia , divides UPPS into pre- and post-styloid compartments.3 Changes that include ITF include those that arise in space, for example, schwannomas and tumors, which attack from neighboring structures such as inverted papilloma, juvenile angiofibroma, cedenoid cystic carcinoma and squamous cell carcinoma.4-7 Its complex neural anatomy has resulted in the development of many classical lateral to medial surgical methods (i.e., antedilucal and pupational, transcer, transparotide or combination) approach, and 8-10 After the development of endoscopic techniques and endoscopic endoscopic or transoral approaches to the removal of benign and selected malignant ITF lesions, 14 The endoscopic transpharyngeal approach to ITF has been well described and, in selected cases, may produce similar results to open approaches with reduced morbidity.14 , 2, 15 However, this may require the sacrifice of multiple neurovascular bundles within fossa pterygopalatine.1 In addition, appropriate exposure to changes in the infiltration of the Eustachian tube or UPPS requires the mobilisation or removal of the soft tissue content of fossa pterygopalatin.16, 17 This leaves significant undesirable consequences because the dedication of the palate nerves and the larger palatine nerves in the pterygopalatine fossa may cause postoperative xerophthalmia and various sensory dysfunctions of the palate (i.e. hypoaesthetism , anaesthesia or deafening pain).10, 18 Furthermore, the lateral and medial muscles of pterygoid must also be cut or cut when approaching the lateral ITF (masticator space), which may contribute to postoperative trismus.1 Cadaveric dissection helped to identify several potential spaces enclosed by pterygoid and temporalis muscles.19 Therefore, we hypothesized that that they can provide safe surgical corridors to and within the ITF. The purpose of this study was to develop a sequential ITF dissection illustrating surgical corridors, which may be beneficial in planning endoscopic approaches to specific changes; therefore, as a result of effective surgical exposure with maximum maintenance of neural structures and pterygoid muscles. Endoscopic medial maxillectomy was combined with Denker's endoscopic approach to ITF in six adult latex cadets samples (12 pages) at the Anatomy Laboratory for Visuospatial Surgical Innovations in Otolaryngology and Neurosurgery (ALT-VISION) at Wexner Medical Center of The Ohio State University. All authors have been certified by local regulatory agencies involved in the use of human tissues and cadaver testing. Each copy underwent a high-resolution CT scan and its digital data was imported into a surgical navigation system (Stryker Corporation; Kalamazoo, Michigan). The 00 endoscope (diameter 4 mm, length 18 cm) connected to the camera and high-resolution monitor (Karl Storz Endoscopy, Tuttlingen, Germany) was used for visualization throughout the dissection. All dissections have been videos and images that have been archived for analysis (AIDA Karl Storz Endoscopy, Tuttlingen, Tuttlingen, Photographs documenting anatomical relations were correlated with multiplanar CT views provided by the image guidance system. High-speed drills (Stryker Co., Kalamazoo, Michigan) with a simple manual piece and diamond burrs of 3 to 4 mm were used to remove and dissection. After endoscopic medial makilectomy and Denker's approach, progressive ITF dissection, including kitator and upper parafaryngeal spaces, was completed. Both techniques have been described in detail in previous studies.20, 21 Posterior nasal septectomy was performed to facilitate the two-shot four-handed technique. According to potential anatomical spaces, we divided the ITF into five different zones. The description diagram is illustrated in Figure 1. Zone 1 (retromaxillary space) is defined as the space lying between the posterolateral wall of the maxillary sinus and the temporalis and pterygoid muscle complex. After identifying the indural nerve on the eye socket floor, posterolateral the wall of the medial maxillary sinus, to which it was removed, to reveal the structure in the pterygopalatine fossa. The remaining posterolateral walls of the maxillary sinus and its periostial lateral to the indior nerve was then removed down to the floor level of the maxillary sinus to reveal the buccal fat pad (Figure 2A), which was carefully removed to reveal the branches of the inner maxillary artery (Figure 2B). Vascular branches were then dedicated to expose the muscles temporalis and pterygoid (Figure 2C). Zone 2 (better interchangeable space) is located at the top of the ITF and consists of the superior lateral head of the pterygoid muscle, V3 and ovale axle (Figure 3A). After careful dissection in pterygopalatine fossa, the maxillary nerve, the pterygopalatin ganglion, and the larger palate nerve were well preserved in all 12 sides. Using the maxillary nerve as a landmark to identify the pterygoid base and the larger wing of the wedge bone, the superior lateral head of the pterygoid muscle was elevated from the larger wing to the wedge-edible plane (Figure 3A). V3 and foramen ovale have been identified posterior to the origin of the lateral plate pterygoid (Figure 3B). Zone 3 (inferior interpterygoid space) includes the lower head of the lateral pterygoid muscle, medial pterygoid, and temporalis muscle. The deep temporal nerve located at the medial boundary of the temporal muscle (Figure 4A) on all 12 sides serves as a landmark for the identification of zone 3 (Figure 4B). After displacing the temporalis muscle laterally, along the space enclosed by the temporalis muscle and the medial and lateral pterygoid muscles in the posterolateral direction, the removed and inferior follicular nerves lie at the upper medial boundary of pterygoid and the inner maxillary artery is detected to enter the posterior aspect of the ITF (Figure 4C). In addition, most of the medial aspect of the mandible ramus and deep fasd head masseter muscle can be exposed under the direction of a range of 00 through this corridor (Figure 4D). Zone 4 (temporal-masoric space) is defined as the lateral space for the temporalis muscle, and contains mainly fat (Figure 5A). The medial aspect of the yoke arch and superficial head of the masseter muscle could be achieved through this space (Figure 5B). Zone 5 (tubopharyngeal space) includes the Eustachius tube, tensor muscles and levator veli palatini, and structures within the UPPS. Neurovascular structures such as the pterygopalatin ganglion, the wijania nerves, the larger and smaller palate nerves, the dwindling palate, and phenopalatin arteries have been dedicated to increasing exposure. After the lateral façade of the pterygoid muscle off the lateral plate of pterygoid, drilling of the pterygoid process, and the lateral pterygoid plate was carried out. Along the upper medial boundary of the pterygoid muscle, towards the posterior, tensor veli palatini muscle in the anterior aspect of the cartilaginous tube Eustachia has been identified and resected, and the levator veli palatini muscle in its anterior anterior aspect has been exposed (Figure 6A). The fat in the pre-styloid chamber has been removed to reveal the deep lobe of the lobe (Figure 6B). Removal of aponeurosis styloid exposed parapharyngeal internal carotid artery (pICA) (Figure 7A). In addition, the inferior crayvical nerves (IX to XI) and the internal carotid vein can be visualized (Figure 7B). The subjulse nerve (XII), however, is posterior to pICA; therefore, its visualization requires the launch of the ship (Figure 7C). Schematic demonstration of zones 1 to 5 on MRI scans. A, Zone 1, Zone 3, Zone 5; B, Zone 2, Zone 4; C, Zone 1 (red dotted lines), zone 2 to zone 4 (blue dotted lines), and zone 5 (green dot lines) in the arrow image. M, medial muscle pterygoid; L, lateral pterygoid muscles (inferior head); T, temporalis muscles; Ma, masseur muscle; z, zygomatic arch; E, eustachius tube; L-s, better head of the lateral muscle pterygoid; pICA, parapharyngeal internal carotid artery [color drawing can be viewed in wileyonlinelibrary.com] A, After removal of the posterolateral wall of the maxillary sinus and its periostial, fat (F), and branches of the posterior alveolar artery (PSAA, blue arrow) are identified; B, the main branches of the inner maxillary artery (IMA); C, part of the buccal fat pad has been removed to reveal muscle temporalis (TM) and lateral muscle pterygoid (LPTM). IOA, inferior orbital artery; DPA, descending palate artery [color drawing can be viewed in wileyonlinelibrary.com] A, Maxillary nerve (MN) may then be used to identify the ochnoid rotundum (FR), (PB) and the larger wing of the wedge bone (GW), the superior lateral head of the pterygoid muscle (LPTM) was raised from GW in the subperiosteal plane; B, Foramen ovale (FO) and V3 are visualized [Color drawing can be viewed at wileyonlinelibrary.com] A, Deep temporal nerve (arrow) is consistently located at the medial boundary of the temporalis muscle (TM), which is a landmark for identifying the entrance to zone 3 (highlighted part); B, Zone 3 has been closed by medial (MPTM) and lateral muscles pterygoid (LPTM) and TM; C, the lingual nerve (LN), the inferior follicular nerve (IAN), the inner maxillary artery (IMA) and the mandibular ramus (MR) can be detected in this space; D, medial aspect of MR and deep head reticute masseter (closed dot lines) may be available [Color drawing can be viewed on wileyonlinelibrary.com] After removal of fat (F) in zone 4, A, the yoke arch (A) and superficial head of the maeca muscle (Ma) may be exposed, B [Color drawing can be viewed on wileyonlinelibrary.com] , after cutting the muscle tensor veli palatini could identify the tube of Eustachius (ET) and the muscle lvli palatini (LVPM); B, After removing the fat in the pre-styloid space, the deep lobe of the at-ear gland (arrow) could be viewed. SA, styloid aponeurosis [Color drawing can be viewed in wileyonlinelibrary.com] A, After removal of aponeurosis styloid (SA), pICA can be visualized (arrow); B, Crayv nerves IX and X may be located between the pICA and the internal cervical vein (IJV) and the nerve of the xi skull located posterior to IJV; C, Crayvary nerve XII is visualized posterior to pICA [Color drawing can be viewed wileyonlinelibrary.com] Despite significant advances in optics, endonastic instrumentation and endonasal techniques, managing changes in the ITF through an endonastic endoscopic approach continues to be a surgical challenge.15 A surgical approach to ITF based on pre-existing pathways represented by potentially mentioned anatomical spaces helps to save intact tissues.15 22 In addition, maximum behaviour of normal neighbouring structures (innocent bystanders) when the change is limited to one specific region, it maintains postoperative function and quality of life. In the current study, zone dissection 1-4 did not require manipulation of neural structures within fossa pterygoatin; however, the dissection of zone 5 required its mobilization or sacrifice, as it involves drilling the pterygoid process and raising the lower lateral head of the pterygoid muscle from the lateral plate of pterygoid. The aforementioned classification of ITF corridors, based on chewing muscles and their innerness, provides clinically relevant guidance on access to relevant areas. Zone 1 (retromaxillary space) contains fat and branches of the inner jaw (pterygoid muscles are found in the posterior aspect) and is best accessed by an endoscopic endonasal approach (prelacrimal or transantral). A series of cases of Zhou et al included tumour resection, which was exposed after resection of the posterior wall of the maxillary sinus, as described in zone 1 suggested in this study.23 In addition, zone 1 also constitutes a surgical corridor to manage lesions extending from the nasal cavity to the anterior aspect of the ITF through the fosa pterygopala (e.g., angiofibroma).24 Zone 2, or better intercoating space, correlates closely with oval analysis , V3, and postponed the lateral head of the pterygoid muscle. Theoretically, this zone should be a relatively common place of origin for nerve tumors, such as schwannoma.4 In addition to managing the lesions that come with V3, endoscopic access to zone 2 also includes a corridor that can reach the middle skull of the moat and meckel cave (through the prefrontal triangle closed by V2 and V3).25 Zone 3, or the lower intercoatation space, corresponds to the potential space enclosed by the lower head of the lateral pteregoid , medial muscles of pterygoid and temporalis containing fat and branches of the inner maxillary artery and V3. The calculated nerve and the lower vental nerve, resulting from the posterior trunk V3 travel through this space, and also can spring neural-related tumors.9 In addition, this space communicates with the medial aspect of the mandible of the ramus and the deep head of the articular muscle; whereas, therefore, Zone 3 provides a natural corridor of access to lesions originating in or extending to the medial aspect of the mandible ramus, Elimination need to sacrifice any of the chewing muscles (i.e. inferior head lateral muscle pterygoid, medial pterygoid, or temporalis muscle).26 In cadaveric dissection, removal of the posterolateral wall of the maxillary sinus down to the level of the maxillary floor will increase the exposure of Zone 3. However, in the case of changes at the bottom of the ITF around the mandibular angle, we found that the nasal cavity floor would reduce exposure and the use of simple instruments through a transnasal approach. For this kind of variability, an external transcervical or transparotid or endoscopic transoral corridor with the help of robotics may be an alternative choice.14, 17 Zone 4, or time-masseric space, lies between the temporalis muscle and archromatic and contains mainly fat. It was possible to access the medial aspect of the yoke arch and the superficial head of the masseur muscle; however, changes in the region are rare. However, this corridor is often used as a way to transpose the temporal fascia flap to reconstruct the base of the skull.27 Under the endoscopic direction of transposition a corridor represented by zone 4 can eliminate additional damage to the structure within the ITF. Due to its deep location, reaching zone 5 (tubular space) involves a complex surgical technique that requires the dedication of certain normal structures, such as the vidian nerve, pterygopalatin ganglion, larger and smaller palate nerves, and the final branches of the maxillary artery.1 In our cadaveric decay, it was necessary to drill the pterygoid process and disconnect the lateral perigoid. , the maxillary nerve and medial pterygoid muscle can be preserved. Changes in the post-styloid ventricle, including pICA, cranoid nerves IX to XII and the inner carotid vein, are exposed only after removal of styloid aponeurosis.28, 29 Conversely, changes originating from the pre-styloid compartment do not require the removal of styloid aponerosis. In this area, abundant oozing is predicted; therefore, an endoscopic approach of Denker21 or maxillotomy or variant is enabled to facilitate the technique of four hands. The most common indication for zone 5 approaches are benign lesion (i.e. parapharyngeal space tumors) that come from space. Infiltration of parapharyngeal space by malignancy (eg, nasopharyngeal cancer), especially those that enter the pICA, may be a contraindication for the endoscopic endoscopic corridor.30 According to the authors, this systematic approach to anatomical corridors to the ITF has not been noted before. However, we are aware that this study contains significant limitations. This is preclynic work on normal cadetic samples that cannot mimic the various anatomical changes caused by the tumor; therefore, its usability must still be confirmed in live operations. What's more, the use of virtual reality techniques in future studies could help surgeons better learn anatomy in this complex area. In addition, the ITF classification is indicated mainly for endoscopic transnasal approaches; in the case of a transcervical or transoral approach to access the ITF, however, the usefulness of the classification system still deserves approval. In addition, a poorly pneumatic maxillary sinus will also reduce ITF exposure through a transnasal approach. Itf can be divided into five zones based on the spaces enclosed by chewing muscles. This paradigm provides guidance for planning endoscopic approaches to ITF and helps to avoid damage to neural structures and pterygoid muscles. Authors have no funding, financial relationships or conflicts of interest to disclose. 1Falcon RT, Rivera-Serrano CM, Miranda JF, et al. Endoscopic endoscopic dissection of the intramnomysy phospha: anatomical relations and the importance of the eustachias tube in endoscopic surgery of the base of the skull. Laryngoscope. 2011; 121: 31- 41. PV, Guthikonda B, Brescia A, Keller JT, Zimmer LA. 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