Infratemporal fossa ct

You work off campus? Information about our remote access options Volume 42, Issue 5 Chapter Editor: Dennis Kraus infratemporal fossa (ITF) represents an area filled with neurovascular structures within intense irregular boundaries. The aim of this study was to classify the ITF into anatomical cavities and regions corresponding to the order encountered during the endonasal approach (anteroposterior axis). Six cadaver samples (12 sides) with injected colored latex were examined. Following endoscopic medial maxillectomy and Denker's approach, the phased exploration of the masticator field and upper paraffiningeal field was completed. It was determined that the ITF was classified according to well-defined areas. The ITF is divided into five regions: Zone 1 (retromaxillary space)—the maxillary sinus posterolateral wall and the space that lies between the temporalis and pterygoid muscles. Zone 2 (superior interpterygoid area)-area including superior head of lateral pterygoid muscle, V3, and foramen ovale. Zone 3 (inferior interpterygoid area)—lateral pterygoid muscle contains inferior head, medial pterygoid, and temporalis muscles, and the area is closed by these muscles. Zone 4 (temporo-masseteric space)—temporalis muscle (mostly composed of fat) space lateral. Zone 5 (tubopharyngeal space)—Contains structures in the euthan ary tube, tensor and levator parent palatini muscles and upper parapharmageal area. The ITF masticator can be visualized as five zones based on indoor areas by muscles and upper paraphaningeal structures. This new classification system is useful for directing endoscopic approaches to THE ITF while reducing the injury potential of neurovascular structures and pterygoid muscles. Infratemporal fossa (ITF) is an anatomical area with irregular boundaries, covering the masticator and upper parapharmaceal cavities (UPPS) and located below the base of the middle cranial fossa.1 In turn, The masticator area includes medial and lateral pterygoid muscles, temporalis muscle tendon, internal maxillary artery, maxillary (V2) and mandibular (V3) trigeminal nerve branches, tensor and levator veli palatini muscles , and styloid diaphragm created by Ostaki tube.2 Stiloid aponeurosis divides UPPS into pre- and post-styloid compartments.3 Lesions containing ITF include those that occur in space, for example, schwannomas and tumors invading neighboring structures such as reverse papilloma, juvenile angiofibroma, adenoid cystic carcinoma and scuamous cell carcinoma.4-7 Complex neurovascular anatomimedial approaches have given birth to the development of multiple classical surgical approaches following lateral monitoring (i.e., pre- and postaluricular, transservical, transparotid or combined approaches) and (i.e. trans-maxillary) or medial (i.e., transoral) pathways.8-10 Following the development of endoscopic techniques and instrumentation, endoscopic endocopal or transoral approaches to the removal of benign and selected malignant lesions of the ITF have gained popularity.11-13 Note, Removal of tumors in the pre-stiloid parapharoengeal area with the help of robotics has had satisfactory results.14 The endoscopic transpterygoid approach to ITF is well defined and, in certain cases, may produce similar results for open approaches with decreased morbidity.1 , 2, 15 However, pterygopalatine may require sacrifice of multiple neurovascular bundles in fossa.1 Also, Adequate exposure to ostaki tube or UPPS leaking lesions requires the mobilization or removal of soft tissue contents of pterygopalatine fossa.16, 17 This important unwanted continuation leaves , pterygopalatine fossa vidian and larger palatine nerves can cause a variety of post-operative xerophthalmia and palate sensory disorders as victims (i.e., hypoesthesia, anesthesia or deafferentation pain).10 , 18 Furthermore, lateral and medial pterygoid muscles need to be transekse or respersed when approaching the lateral ITF (masticator area), which can also contribute to postoperative trismus.1 Kadavradisandisezive lustyon, pterygoid and temporal iskas have helped identify several potential cavity that are closed.19 Therefore, we have longed that they can provide safe surgical corridors to the ITF and within the ITF. The aim of this study was to develop a sequential ITF dissection showing surgical corridors, which can be useful when planning endoscopic approaches to specific lesions; therefore, resulting in effective surgical exposure with maximal protection of neurovascular structures and pterygoid muscles. Endoscopic medial maxillectomy was combined with endoscopic Denker's approach to ITF in six adult latex-injected cadastre samples (12 parties) at the Anatomy Laboratory toward Visuospatial Surgical Innovations in Autolarenjology and Neurosurgery at Ohio State University's Wexner Medical Center. All authors have been certified by local regulatory agencies regarding the use of human tissues and cadaver studies. Each sample understed a high-resolution CT scan, and its digital data was sent to the surgical navigation system (Stryker Corporation; Kalamazoo, Michigan). 00 endoscopes (4 mm diameter, 18 cm long) combined with high resolution camera and monitor (Karl Storz Endoscopy, Tuttlingen, Germany) were used to provide visualization throughout the dissection. All dissections are documented with archived video recordings and images for analysis (AIDA system Karl Storz Endoscopy, Tuttlingen, The photographs documenting anatomical relationships were able to correlation with the multi-planar IT views provided by the image orientation system. A flat hand piece and a 3 to 4 mm rough diamond burr high-speed drill (Stryker Co., Kalamazoo, Michigan) were used for bone extraction and dissection. Following endoscopic medial maxillectomy and Denker's approach, progressive dissection of the ITF, including the masticator and upper parapharmaeal fields, was completed. Both techniques have been described in detail in previous studies.20, 21 Two nosties undertectomy, posterior nasal septectomy to facilitate four-handed technique. Based on potential anatomical fields, we've separated the ITF into five different regions. A schematic description is shown in Figure 1. Zone 1 (retromaxillary space) is defined as the space lying between the posterolateral wall of the maxillary sinus and the complex of temporalis and pterygoid muscles. After determining the infraorbital nerve on the orbital floor, pterygopalatine fossa structures were removed to reveal the medial posterolateral wall of the maxillary sinus. The maxillary sinus and infraorbital nerve removed the remaining posterolateral wall of his periosteum lateral then flushed down to the level of the maxillary sinus base to reveal the buccal fat pad (Figure 2A), which was carefully removed to reveal branches of the inner maxillary artery (Figure 2B). Vascular branches were then sacrificed to reveal temporalis and pterygoid muscles (Figure 2C). Zone 2 (superior interpterygoid area) is located at the top of the ITF and consists of the superior head of lateral pterygoid muscle, V3 and foramen ovale (Figure 3A). After careful dissection of pterygopalatine fossa, maxillary nerve, pterygopalatine ganglion, and more palatine nerves are also all preserved 12 sides. The upper head of the lateral pterygoid muscle, which uses the maxillary nerve as a turning point to identify the pterygoid base and larger wing of the sphenoid bone, was raised from the large wing of the sphenoid following the sub-periosteal plane (Figure 3A). V3 and foramen ovale were identified as posterior to the origin of the lateral pterygoid plate (Figure 3B). Zone 3 (inferior interptergoid area) contains lateral pterygoid muscle inferior head, medial pterygoid, and temporalis muscles. The deep temporal nerve located on the medial ly border of the temporalis cauce (Fig. 4A) on all 12 sides is a turning point for defining Zone 3 (Figure 4B). After the lateral dislocating of the temporalis muscle, temporalis lie in the medial and posterolateral direction by the medial and lateral pterygoid muscles throughout the closed area, at the superior limit of the medial pterygoid of the lingual and inferior alveoler nerves and the internal maxillary artery is entered in the rear direction of the ITF (Fig. 4C). In addition, most of the medial aspect of the mandbula ramus and masseter muscle deep head fascia can be exposed under 00 scope guidance over this corridor (Figure 4D). Zone 4 (temporo-masseteric space) temporalis is defined as the space laterali of the muscle and mainly contains fat (Figure 5A). The medial direction of the zygomatic arch and the superficial head of the masseter muscle can be reached from this area (Figure 5B). Zone 5 (tubopharyngeal area) contains the Eustaki tube, the tensor and levator veli palatini muscles and structures within the UPPS. Neurovascular structures such as pterygopalatine ganglion, vidian nerves, larger and fewer palatine nerves, decreasing palatine, and sphenopalatine arteries were sacrificed to increase exposure. After the elevation of the lateral pterygoid bone from the lateral pterygoid plate, puncturing and lateral pterygoid plate of the pterygoid process were performed. Along the upper boundary of the medial pterygoid blood, in the posterior direction, the tensor veli palatini muscle in the anterolateral part of the cartilage eustyle tube was detected and resized, and the levator parent palatini muscle appeared in the anteroinferior direction (Figure 6A). The fat in the pre-stiloid compartment was removed to reveal the deep lobe of the parotid gland (Figure 6B). Removal of stiloid aponeurosis exposed to the artery of the parapharyneal internal carotid (pICA) (Figure 7A). In addition, inferior cranial nerves (IX-XI) and internal juguler ven can be displayed (Figure 7B). Hypoglossal nerve (XII), however, pICA posterior; therefore, visualization requires mobilizing the ship (Figure 7C). Schematic display of zones 1 through 5 in MRI scans. A, Zone 1, zone 3, zone 5; B, Zone 2, zone 4; C, Zone 1 (red dotted lines), zone 2 through zone 4 (blue dotted lines), and region 5 (green dot lines) in the sagital image. M, medial pterygoid muscle; L, lateral pterygoid muscle (inferior head); T, temporalis muscle; Ma, masseter muscle; z, zygomatic belt; E, the Eustaki tube; L-s, superior head of lateral pterygoid muscle; pICA, parapharmageal internal carotid artery [Color shape wileyonlinelibrary.com can be seen] A, after removal of the maxillary sinus and periosteum posterolateral wall, fat (F) and posterosuperior alveolar artery branches (PSAA, blue arrow) are defined; B, major branches of the Internal maxillary artery (IMA); C, part of the buccal fat pad was removed to reveal temporalis muscle (TM) and lateral pterygoid muscle (LPTM). IOA, inferior orbital artery; DPA, descending palatine artery [Color shape can wileyonlinelibrary.com] A, maxillary nerve (MN) can be followed to identify foramen rotundum (FR), Larger wing of the base (PB) and sphenoid bone (GW), superior head of lateral pterygoid muscle (LPTM) was upgraded to GW on a subperiosteal plane; B, Foramen ovale (FO) and V3 visualized [Color shape wileyonlinelibrary.com] A can be seen, the deep temporal nerve (arrow) is located at the medial border of the turning point for determining the input of continuous temporalis muscle (TM), which zone 3 (highlighted section); B, Zone 3 medial (MPTM) and lateral pterygoid muscles (LPTM) and TM; C, lingual nerve (LN), inferior alveolar nerve (IAN), internal maxillary artery (IMA) and mandibula ramus (MR) can be detected through this area; D, masseter muscle deep head MRI and medial aspect of the fascia accessible [Closed point lines) [Color figure can be seen wileyonlinelibrary.com] after the removed of Zone 4 fat (F), A, zygomatic arch (ZA) and masseter muscle can be exposed to superficial head (Ma), B [Color figure wileyonlinelibrary.com] A can be seen , Tensor veli palateini after muscle bunk, Euthanic tube (ET) and levator veli palatini muscle (LVPM) can be detected; B, after fat is removed in pre-stiloid space, the deep lobe (arrow) of the parotid gland can be seen. SA, stiloid aponeurosis [Color shape wileyonlinelibrary.com] A can be seen, after dissusing stiloid aponeurosis (SA), pICA can be visualized (arrow); B, Cranial nerves IX and X can be located between pICA and internal juguler ven (IJV) and cranial nerve XI IJV posterior; C, Kranial nerve XII pICA posterior visualized [Color shape wileyonlinelibrary.com] despite significant improvements in optic, instrumentation and endonasal techniques, management of ITF lesions with endonasal endoscopic approach still poses a surgical problem.15 Surgical approaches for BTF pre-existent pathways to potentially assist the 15 affected senses represented in the above mentioned anatomical areas. Also, maximal preservation of normal neighboring structures (innocent bystanders) maintain postoperative function and quality of life when a lesion is confined to a specific area. In this study, dissection of 1-4 regions does not require any manipulation of neurovascular structures in pterygopalatine fossa; However, zone dissection 5 requires its mobilization or sacrifice as the pterygoid process includes drilling and lateral pterygoid muscle lateral pterygoid plate off the lower head height. The above-mentioned classification of MASTICATION muscles and THEIR innervation-based ITF corridors provides clinically relevant guidelines for accessing relevant areas. Zone 1 (retromaxillary area) contains oil and inner maxillary branches (pterygoid muscles are located in the posterior aspect) and are best accessed by endoscopic endogenous approach (prelacrimal or transantral). A series of cases made by Zhou et al, in accordance with the definition of region 1 recommended in this study, Including resection of a tumor exposed after resection of the maxillary sinus posterolateral wall.23 In addition, zone 1 also constitutes a surgical corridor for the management of lesions ranging from the nasal cavity to the annuity of the ITF through pterygopalatine fossa (eg , angiofibrom).24 Zone 2, or superior interpterygoid area, closely related to foramen ovale Superior head of muscle, V3, and lateral pterygoid. Theoretically, this region should be a relatively common starting area for neural tumors such as schwannoma.4 In addition to the management of lesions caused by V3, endoscopic access into Zone 2 also includes a corridor that can reach the middle cranial fossa and Meckel's cave (via the anterolateral triangle surrounded by V2 and V3).25 Zone 3, or sub-interptgoid space , corresponds to the potential area closed by the lateral pterygoid inferior head The muscles of the medial pterygoid and temporalis contain fat, and branches of the inner maxillary artery and V3. The lingual nerve and inferior alveoler nerve, resulting from travel in this area of the posterior trunk of V3, and can also spring neural-related tumors.9 Also, this area communicates with the medial direction of the mandbula ramus and the deep head fascia of the masseter muscle; Therefore, Zone 3 provides a natural corridor for accessing lesions extending into the medial direction of the mandural ramus that favors the masticator muscles (i.e., eliminating the need for any sacrifice, lateral pterygoid muscle inferior head, medial pterygoid, or temporalis muscles).26 Cadastre dissection, removal of the posterolateral wall of the maxillary sinus will increase exposure to the maxillary ground level flushed to ground level. However, for lesions that occur around the angle of the mandibla at the bottom of the ITF, we determined that the floor of the nasal cavity would limit the exposure and use of flat instruments with a transnasal approach. For such variation, perhaps an alternative choice of endoscopic transoral corridor with the help of external transservical or transparotid approach or robotic.14, 17 Zone 4, or temporo-masseteric space, temporalis leaves between muscle and zygomatic arch and mainly contains fat. A zygomatic arch has access to the medial direction and superficial head of the masseter muscle; however, lesions in this area are rare. However, this corridor is often used as a boulevard for the transpose of a temporoparietal fascia flap for restructuring at the base of the skull.27 Under the endoscopic guide, The fascia flap through the corridor represented by zone 4 has the potential to cause additional damage to structures within the ITF. Due to its deep position, reaching region 5 (tubopharyngeal area) includes a complex surgical technique that requires the sacrifice of some normal structures such as the vidian nerve, pterygopalatine ganglion, larger and less palatine nerves and terminal branches of the inner maxillary artery.1 Our cadaveric dissection, puncturing of the pterygoid process and separation of the lateral pteryid muscle was necessary , the maxillary nerve and medial pterygoid muscle can be preserved. Lesions in the post-styloid compartment, including PICA, cranial nerves IX-XII and internal jugular vein, but lesions that occur in the pre-stiloid compartment, as opposed to stiloid aponeurosis.28, 29, do not require the removal of stiloid aponeurosis. Plenty of infiltration is expected in this area; Therefore, an endoscopic Denker approach21 or anterior maxillotomy or a variant is included to facilitate the technique of four hands. The most common indication for Zone 5 is benign lesions (i.e. parapharmaeal space tumors) that occur within the area. Infiltration of the parapharmaceleal area by a malignancy (e.g., nasophaceteal carcinoma), especially those who encompass pICA, may be a contraindication to the endoscopic endonasal corridor.30 According to the authors, this systematic approach to anatomical corridors to the ITF has not been reported before. However, we are aware that this study covers significant limitations. It is a preceding study on normal cadaver samples that cannot mimic the diversity of anatomical changes brought about by a tumor; thus, the benefit still needs to be operated live. Moreover, the application of virtual reality techniques in future studies can help surgeons learn anatomy better in this complex area. In addition, ITF classification is mainly instiliable for endoscopic transnasal approaches; The transservical or transoral approach to accessing the ITF, however, the utility of the classification system still deserves verification. In addition, poorly pneumatized maxillary sinus will also limit ITF exposure with a transnazal approach. ITF mastication can be divided into five regions based on indoor areas by muscles. This paradigm provides guidance for the planning of ITF endoscopic approaches and helps prevent damage to neurovascular structures and pterygoid muscles. The authors have no funding, financial relationships or conflicts of interest to disclose. 1Hawk RT, Rivera-Serrano CM, Miranda JF, and others. Endoscopic endoscopic dissection of infratemporal fossa: anatomical relationships and importance of the eustic tube in endoscopic head base surgery. Larynoscope. 2011; 121: 31- 41. PV, Guthikonda B, Brescia A, Keller JT, Zimmer LA. 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