

ROLE OF C.T. IN DIAGNOSIS OF
MAXILLARY LESIONS

THESIS

Submitted in partial fulfilment for
M. SC. Radiodiagnosis

BY

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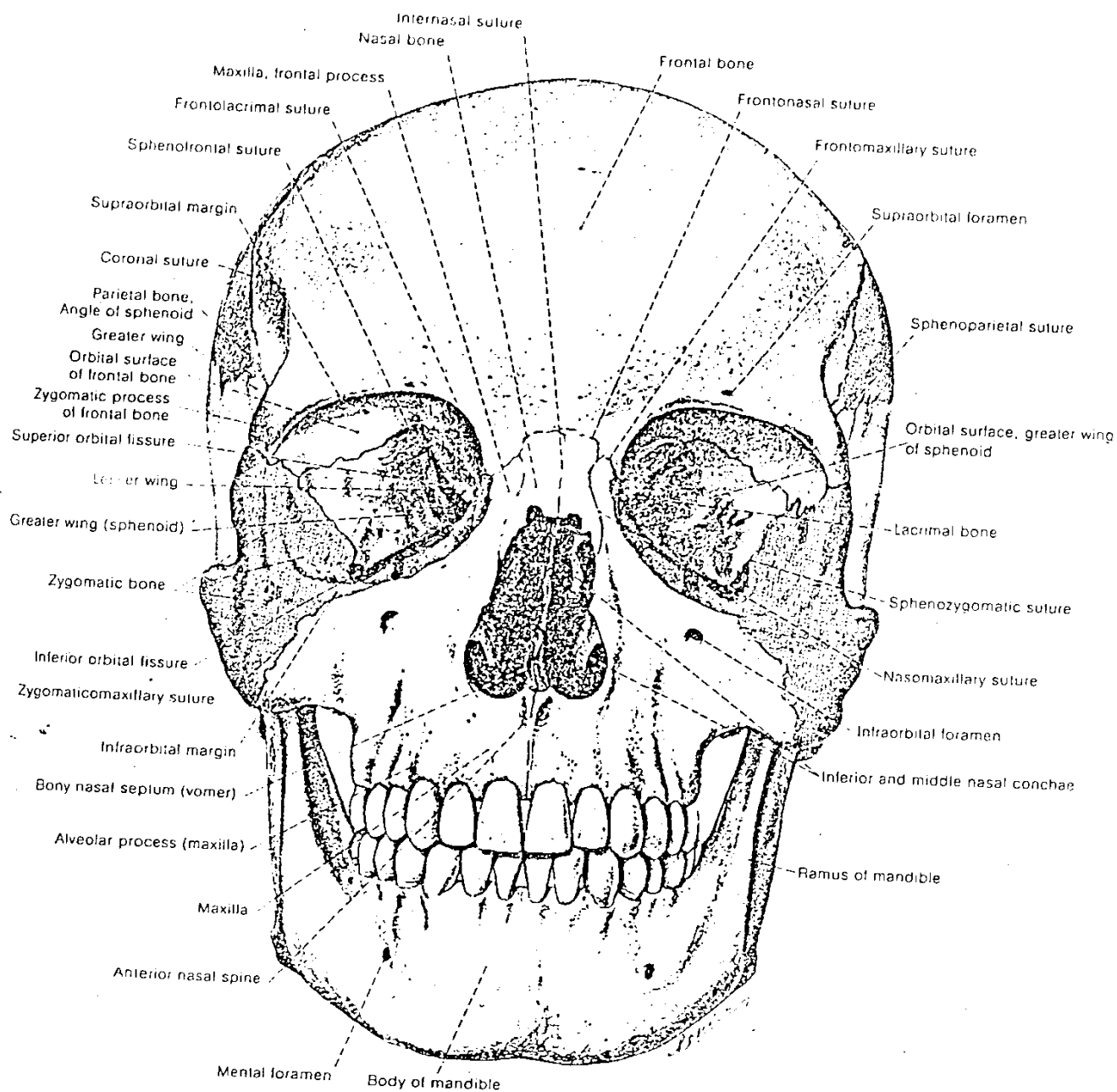


Fig. 1. The skull. Anterior aspect. The bones are set apart by different colors.

(quoted from Sobatta 1989)

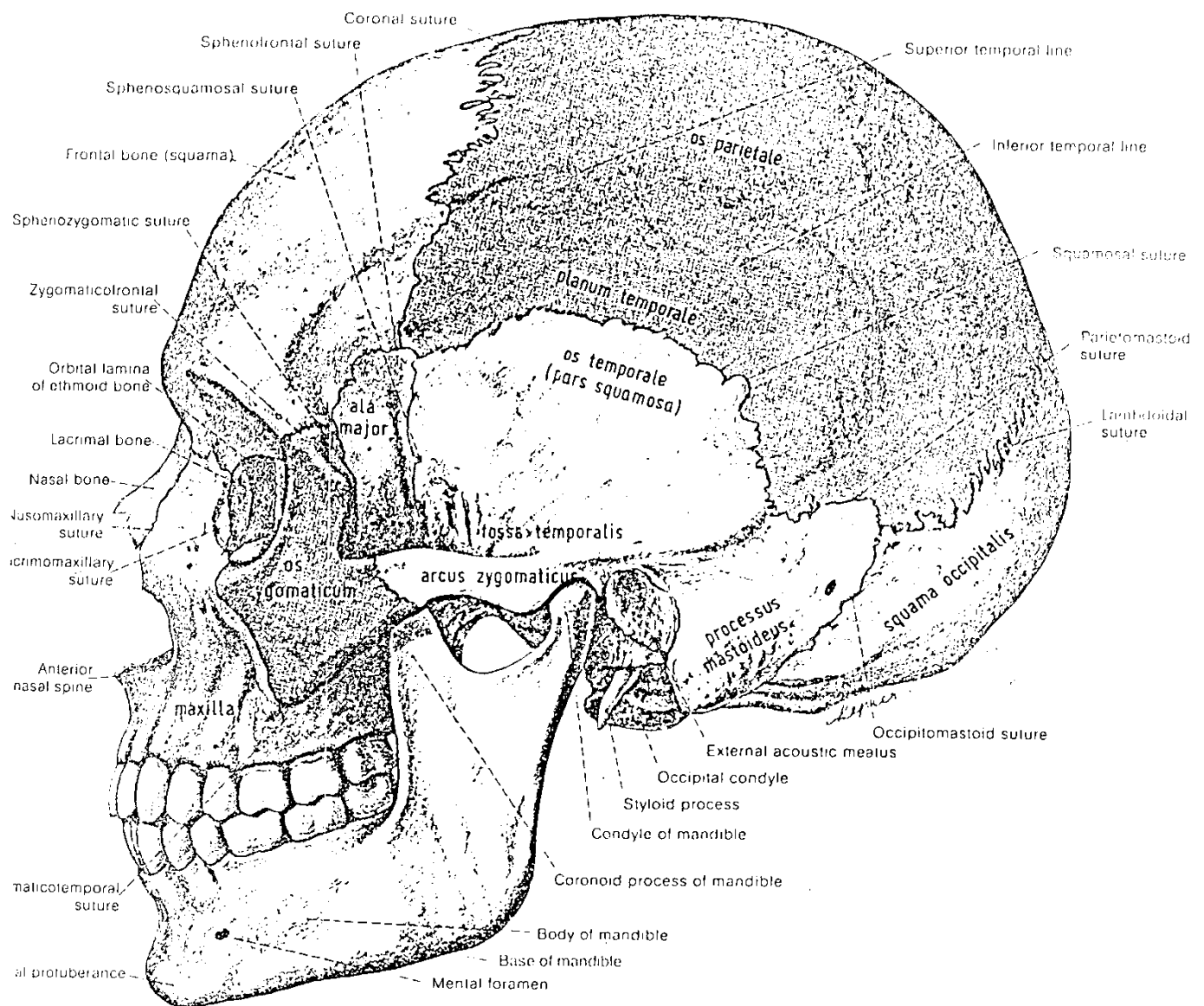


Fig. 2 The skull. Left lateral view. The bones forming the cranium and facial skeleton are differentiated by color.

(quoted from Sobotta 1989)

THE MAXILLA

The skeleton of the central face consists of an outer zygomatico-maxillary buttress and a deeper midline palato-nasal complex of bones (figs. 1 & 2). The paired maxillae are broad three-sided pyramids, with a central body and four processes that abut at suture lines with the zygomatic, palatine, nasal, sphenoid and smaller orbital bones (fig. 3). The maxillae function as a base for containing the teeth, support for nasal cartilages, attachment of facial muscles, as a shell for the maxillary sinuses and as the major plates of the bony palate and floor of the orbit. The anterior limit of the maxilla is the prominent anterior nasal spine and its lateral continuation is the sharp margin of the piriform rim. The firm vascular epithelium of the nasal floor is loosely attached along this rim and can be easily elevated to expose the roof of the palatine process of the maxilla as is often necessary in maxillary orthognathic surgery. A concavity at the midanterior maxillary surface, the canine fossa, is a common zone for localization of odontogenic infections. Its lateral wall expands upwards to meet the zygomatic bone, forming the molar eminence. Posteriorly, the maxillary tuberosity abuts against the pterygoid process of the sphenoid bone at the sharply-defined pterygo-palatine fissure. Inferiorly, the maxilla ends at the alveolar margin which gives attachment

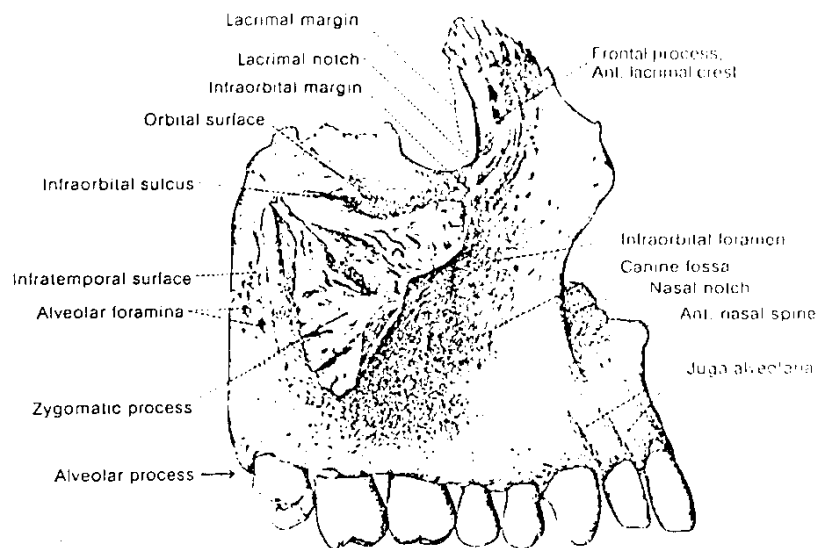


Fig. 284. Right maxilla. Lateral view.

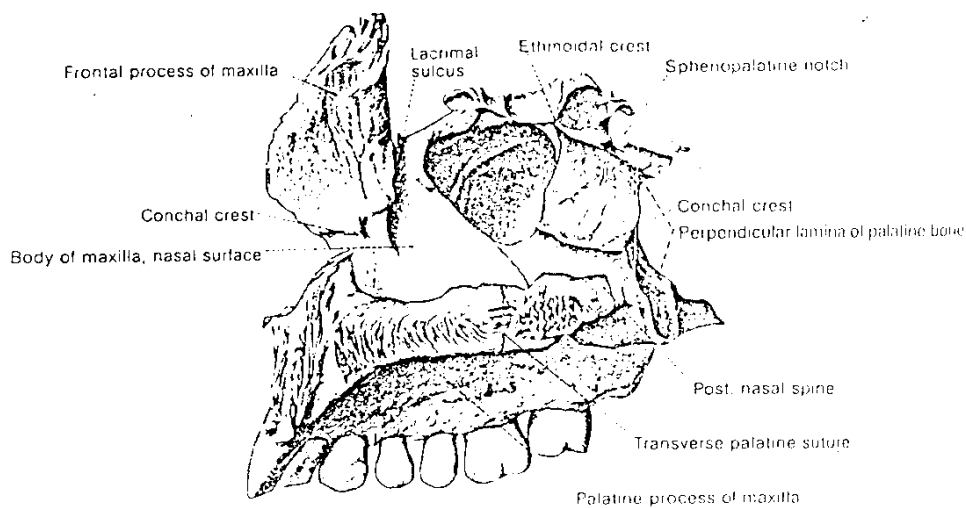
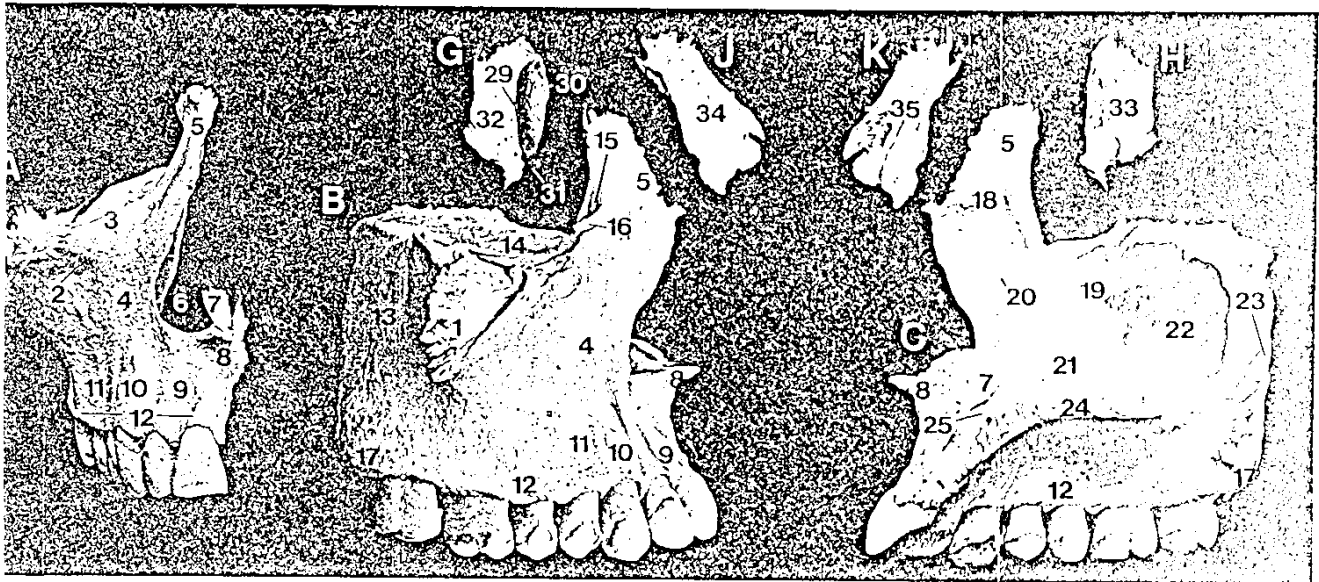


Fig. 285. Right maxilla and palatine bones. Palatine, blue.

(quoted from Sobatta 1989)



maxilla, A from the front, B from the lateral side, C from the medial side, D from below, E from above, F from behind

- | | |
|-----------------------|--------------------------------|
| zygomatic process | 15 Nasolacrimal groove |
| infra-orbital foramen | 16 Anterior lacrimal crest |
| infra-orbital margin | 17 Tuberosity |
| anterior surface | 18 Ethmoidal crest |
| nasal process | 19 Middle meatus |
| nasal notch | 20 Conchal crest |
| nasal crest | 21 Inferior meatus |
| anterior nasal spine | 22 Maxillary hiatus and sinus |
| nasal fossa | 23 Greater palatine canal |
| nasal eminence | 24 Palatine process |
| nasal fossa | 25 Incisive canal |
| zygomatic process | 26 Unerupted third molar tooth |
| atemporal surface | 27 Infra-orbital groove |
| nasal surface | 28 Infra-orbital canal |

Right lacrimal bone, G from the lateral side, H from the medial side

- | |
|-----------------------------|
| 29 Posterior lacrimal crest |
| 30 Groove for lacrimal sac |
| 31 Lacrimal hamulus |
| 32 Orbital surface |
| 33 Nasal surface |

Right nasal bone, J from the lateral side, K from the medial side

- | |
|---|
| 34 Lateral surface and vascular foramen |
| 35 Internal surface and groove for anterior ethmoidal nerve |

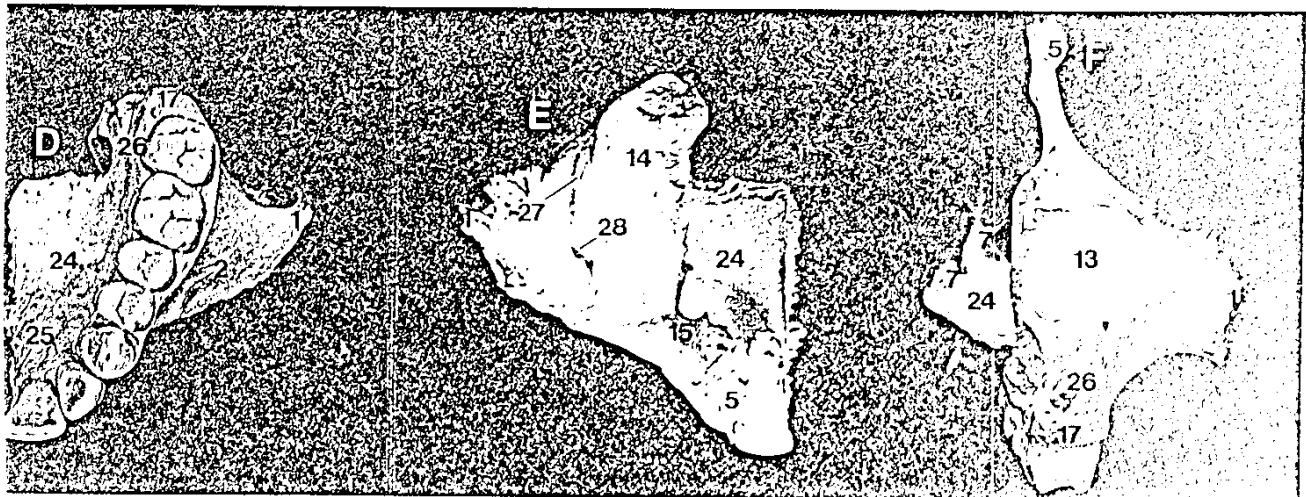


fig.4

(quoted from Sobatta 1989)

for the upper teeth. Superiorly, its orbital surface forms part of the floor of the orbit, and is bounded by the lacrimal notch and the inferior orbital fissure. (Right maxilla with its surfaces are shown in fig. 4).

The maxillary sinus

The maxillary sinus is the largest of the para-nasal sinuses, occupying the entire body of each maxilla in the adult. It is pyramidal in shape with a floor at or below the level of the nasal floor, and a roof that slopes antero-laterally and is flat except for a distinct ridge formed by the infra-orbital canal. The floor may be partitioned by bony septa, specially in the posterior one third, which may hinder the retrieval of foreign bodies such as tooth roots that might have been displaced into the sinus. The highest point of the antrum is in the postero-medial apex, which lies under the orbital apex. The medial wall of each maxillary sinus is also the infero-lateral wall of each nasal cavity. The postero-lateral antral wall is formed by the curved infra-temporal bony wall of the maxilla. The anterior wall of the antrum is the anterior wall of the maxilla. The posterior wall on its medial aspect forms the anterior border of the pterygo-palatine fossa. The maxillary sinus ostium opens into the hiatus semilunaris below the bulla

ethmoidalis and above the uncinate process (fig. 5). It is

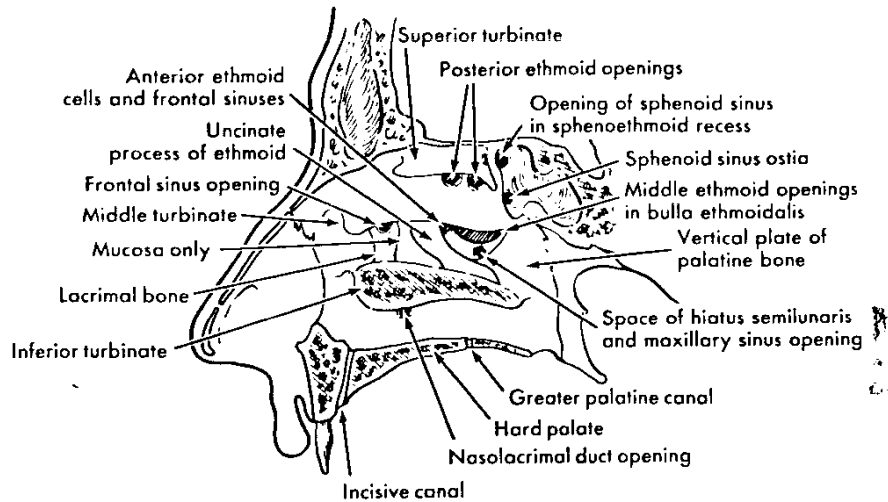


Fig. 5. Schematic drawing of lateral nasal cavity wall with turbinates partially removed. Note the bones composing this wall and the one segment composed only of mucosa. Also note sinus ostia. (After Davies, J.: Embryology and anatomy of the face, palate, nose and paranasal sinuses. In Paparella, M.M., and Shumrick, D.A., editors: Otolaryngology, vol. 1, Philadelphia, 1973, W.B. Saunders Co.)

therefore far above the sinus floor and opens relatively high on the lateral nasal wall. An accessory ostium is present just above the posterior aspect of the inferior turbinates in 30-40% of specimens.

Axial Scans

It is more used than the coronal one. The best plane for C.T. scan of the maxilla, maxillary sinuses and other para-nasal sinuses is parallel to the infra-orbital meatal line (I.O.M.). This scan angle is nearly parallel to the planes of the hard palate, zygomatic arch, and the lateral portions of the orbital floor and much of the orbital roofs.

It begins at the maxillary alveolus just below the hard palate and should end above the frontal sinuses. This approach assures complete coverage of the maxilla and all para-nasal sinuses as well as the nasopharynx, para-pharyngeal spaces and the skull base. Primary lesions of the anterior cranial fossa which present clinically as para-nasal sinus disease and secondary intra-cranial extension from primary disease of para-nasal sinuses will be imaged successfully. the thickness of each slice should be no greater than 5 mms. Thicker slices will average out a diagnosis or establishing operability. Scan slices at 1.5-2 mms. are not needed for the most of cases. They are only used for a small region and then only a few such slices are required



Figure 17

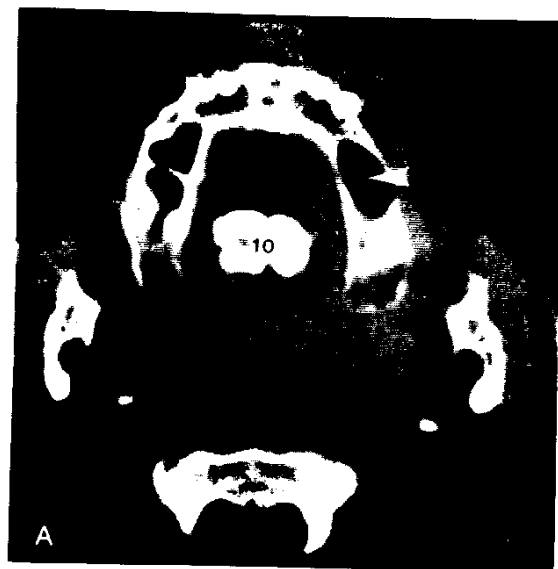


Figure 18

Fig. 6: Axial scan at level of hard palate showing greater(47) and lesser(48) palatine foramina ramus of mandible (30)and masseter muscle(52).

Fig. 7: Axial scan at level of alveolar ridge of maxilla showing inferior extension of maxillary sinus (8), inferior bony projection of hard palate (torus palantinus) (10), it also shows medial pterygoid muscle (50), mandibular foramen (32) and oropharynx.

