The infratemporal region is filled with the contents of this area are lateral pterygoid muscle, maxillary artery, mandibular nerve, middle meningeal artery. The most common reason for this is Auriculotemporal neuralgia due to disorders of the temporomandibular joint. The ATN usually has 2 roots arising from the posterior division of mandibular nerve, it encircles the middle meningeal artery (MMA), then runs behind TMJ emerging deep to the upper part of parotid gland. The ATN is in close anatomic relation to the condylar process, the TMJ, the superficial temporal artery (STA) and the lateral pterygoid muscle. ATN compression by hypertrophied Lateral pterygoid muscle may result in neuralgia or paresthesia of TMJ, external acoustic meatus and facial muscles. Further it may result in functional impairment of ipsilateral salivation. In addition, the altered position of the ATN and its extensive or multiple loops may render the ATN more liable to entrapment neuropathy. The ATN, Auriculotemporal nerve – A Study on its Roots. The chief contents of this area are lateral pterygoid muscle, maxillary artery, mandibular nerve, otic ganglion and the pterygoid venous plexus. The mandibular nerve which is one of the principal contents of the fossa divides into anterior and posterior divisions in this region. The anterior division primarily gives muscular branches to muscles of mastication while the posterior division predominantly gives three sensory branches they are lingual, inferior alveolar and auricolotemporal nerve (ATN). There are lot of variations reported in the literature regarding the branches of the posterior division of the mandibular nerve. The branches of posterior division mainly innervate the mandibular teeth, TMJ and all the major salivary glands. Hence the knowledge of these variations are important because of significant innervations and relationships with important anatomical structures. Sensory innervation of the TMJ arises primarily from the ATN with some accessory branches from the masseteric and deep posterior temporal nerves. One of the frequent complaints in the clinical set up in this area is orofacial pain. The most common reason for this is Auriculotemporal neuralgia due to disorders of the temporomandibular joint. The ATN usually has 2 roots arising from the posterior division of mandibular nerve, it encircles the middle meningeal artery (MMA), then runs behind TMJ emerging deep to the upper part of parotid gland. The ATN is in close anatomic relation to the condylar process, the TMJ, the superficial temporal artery (STA) and the lateral pterygoid muscle. ATN compression by hypertrophied Lateral pterygoid muscle may result in neuralgia or paresthesia of TMJ, external acoustic meatus and facial muscles. Further it may result in functional impairment of ipsilateral salivation. In addition, the altered position of the ATN and its extensive or multiple loops may render the ATN more liable to entrapment neuropathy.
This study was conducted to determine the anatomic relationship of the ATN to the MMA and also to identify the variations in the number of roots forming the nerve and their relation to the MMA.

**Materials and Methods:**
Thirty specimens of infratemporal fossae, in the Department of Anatomy, Kasturba Medical College, Manipal, Karnataka, India were dissected meticulously following the instructions given in the Cunningham’s manual of practical anatomy. (6) The variations in the roots of the ATN were noted and photographed.

**Results**
The results are tabulated in Table 1.

<table>
<thead>
<tr>
<th>Number of roots</th>
<th>Number of specimens</th>
<th>Percentage%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single root (Fig 1.)</td>
<td>3</td>
<td>10</td>
</tr>
<tr>
<td>Passing medial to MMA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Passing lateral to MMA</td>
<td>1</td>
<td>3.33</td>
</tr>
<tr>
<td>Two roots encircling the MMA (Fig 2.)</td>
<td>22</td>
<td>73.33</td>
</tr>
<tr>
<td>Three roots with one root passing lateral to MMA and two roots passing medial to MMA (Fig 3.)</td>
<td>3</td>
<td>10</td>
</tr>
<tr>
<td>Five roots with one root passing lateral to MMA and four roots passing medial to MMA (Fig 4.)</td>
<td>1</td>
<td>3.33</td>
</tr>
</tbody>
</table>

**Discussion**
Auriculotemporal neuralgia is characterized by acute unilateral shooting pain that is felt in the temporal region, TMJ, and in the parotid, auricular and retro-orbital region.(4) Knowledge of the anatomy of the ATN and MMA in the infratemporal fossa is necessary for arriving at an appropriate clinical diagnosis and intervention.(5) According to a case report acute paroxysmal orofacial pain triggered by mastication and maximum mouth opening (MMO) showed absence of pain without recurrence on anesthetic blockade of ATN. (4) In earlier studies, reports have suggested multiple roots in the formation of ATN. In a study conducted on eight cadaveric heads i.e sixteen sides, ATN was found to have a single trunk along the medial aspect of the condylar neck and the nerve trunk was identified as having direct contact with condylar neck in every specimen.(5) In another study on infratemporal fossa of 25 heads it was found that 8 specimens had one root, twelve had 2 roots, five had 3 roots and one had 4 roots. Two cases in these had button hole arrangement of ATN which did not enclose the middle meningeal artery.(7) As described by anatomists in a previous study of
infratemporal fossa, the number of ATN roots varied from 1 to 5. The most frequent being one and two roots followed by 5 roots seen in 25% cases, 3 and 4 roots in 6% cases. In five and four root variants number of complicated associations between roots were observed. (8) In a study among dissections of 32 infra temporal fossae, 3.1% specimens had four roots, 9.4% had three roots, 37.5% had 2 roots and 50% of the specimens had one root. In the same study the specimen with four roots, the roots were found to lay posterosuperior to maxillary and superficial temporal arteries. The roots combined to form a ganglion like knot which was excised and stained with Haematoxylin and Eosin. It was observed that the structure was not a true ganglion but a fusion of nerve fibres. (9)

In our study of 30 dissected infratemporal fossae comparatively, single root was observed in four specimens (13.33%). Out of these four, in three specimens (10%) the root passed medial to the MMA and in one specimen the root passed lateral to the MMA (3.33%). (Fig 1.)

Two roots were observed in twenty two specimens (73.33%). In all these specimens the roots encircled the MMA. (Fig 2.) Three roots were observed in three specimens (10%). In all these specimens, one root passed lateral and two roots passed medial to the MMA. (Fig 3.)

Five roots were observed in a single specimen. One root passed lateral and the remaining four roots passed medial to the MMA. (Fig 4.)

In the present study no communications between the roots were found. Many previous studies have reported communication between ATN and Inferior alveolar nerves. (10-12) In one case the communicating nerve was seen to split into two to form a buttonhole for the passage of the mylohyoid nerve. It was hypothesized that these anomalous communication maybe due to delayed regression of first arch vessels. (10) A case report presenting variation in the formation of inferior alveolar nerve by three roots i.e one from lingual and two from ATN was identified. The two roots from ATN encircled the middle meningeal artery. (13)

In our study no such variation of inferior alveolar nerve formation was noted.

Conclusion:

There is lot of literature showing variation in the branching pattern of the posterior division of the mandibular nerve. Our study shows the variation in the formation of ATN which is noted in similar studies done by anatomists previously. We have also specified the relation of the roots to the middle meningeal artery the data of which is lacking in collected works of studies done on infra temporal fossa. This is useful in diagnosing the cause of orofacial pain and also surgical administration of anesthetic blockade effectively.

References:


