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The Posterior Deep Temporal Artery of the Crab-eating Monkey

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(one table, one text-figure and 14 figures in four plates)

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Summary: The course, origin and ramification of the posterior deep temporal artery of the crab-eating monkey were studied by the acryl plastic injection method. The artery arose from the maxillary artery distal to the points of origin of the inferior alveolar and the middle meningeal arteries in all examples observed. The branches of the artery were: the anterior branch, the lateral pterygoid branch, the masseteric artery, the temporal lateral and the temporal crestal branch. These supplied the masticatory muscles except for the medial pterygoid muscle. In particular, the distribution territories of these branches were described according to the lamination of the masseter muscle (see Table 1). The artery terminated in the superior, the superoposterior and the posterior branches in the temporal muscle. The lingual branch arose from the maxillary artery near the origin of the posterior deep temporal artery in all examples, and supplied the oral mucosa behind the lower molar teeth, their lingual gingivae and the posterior margin of the mylohyoid muscle and the masticatory muscles except for the masseter.

Introduction

The course and ramifications of the posterior deep temporal artery are located in the infratemporal fossa which is occupied by the medial and lateral pterygoid and the temporal muscles. The distribution territory of the artery expands to the temporal fossa. Near the origin of the artery, various relations are seen with the points of origin of the inferior alveolar artery, the pterygoid muscular branches and other branches which originate from the maxillary artery. In 1978, the present author and his coworkers investigated the posterior deep temporal artery of the dog. The present paper deals in detail with the posterior deep temporal artery, its branches and supply areas in the crab-eating monkey. General descriptions of the artery in monkeys have previously been given in textbooks or works in which the masticatory muscles were surveyed. Some findings on the artery of the present species have been reported by Lineback (1933), Dyrud (1944), Castelli and Huelke (1965) and Suzuki (1975).

Materials and Methods

Twenty adult crab-eating monkeys were used. Acryl plastic was injected via the common carotid arteries by the plastic injection method (Taniguchi, Ohta and Tajiri 1952, 1955). Eighteen injected heads were treated with sodium hydroxide to obtain corrosion specimens, although one side of one head was unsuccessful in preparation. The two other injected heads were preserved in formalin solution for dissection. All the corrosion specimens of the carotid system and formalin-preserved samples were studied in order to elucidate the detailed anatomy of the posterior deep temporal artery, its branches and relationships with surrounding structures.

Findings

The maxillary artery (1.0-2.1, M. 1.60 mm in diameter) ran anteriorly on the medial side of the collum mandibulae (Fig. 4) and came inferolateral to the lateral pterygoid muscle after crossing its inferior margin obliquely from posteromedial to anterolateral (Figs. 2, 3, 7). The inferior alveolar artery arose inferoanteriorly from the inferior wall of the maxillary when it passed medial to the collum (Figs. 2, 3, 11). Simultaneously, the middle meningeal artery (0.5-1.1, M. 0.76 mm) arose from the medial wall of the maxillary (Figs. 4, 7) inferolateral to the lower head of the muscle. The maxillary thus gave rise to the inferior alveolar and middle meningeal arteries, and the lingual branch and the posterior deep temporal artery in that order, respectively (Fig. 4).

The maxillary artery ran anteriorly superolateral to the lingual and inferior alveolar nerves (Fig. 2) and reached the meeting point between the inferior margin of the lower head of the lateral pterygoid and the posterior margin of the medial pterygoid (Fig. 2). At this position, the medial pterygoid branch (0.3-0.6, M. 0.39 mm) arose from the inferior wall of the artery in four of the 35 examples observed, the lateral pterygoid branch (0.3-0.4, M, 0.32 mm) arose in two cases, and both branches arose in two cases (Figs. 2, 14). The artery ran superolaterally on the lateral side of the middle of the venter of the lower head of the lateral prerygoid and medial to the insertion of the deep temporal muscle, and arched anteromedially between the upper and lower heads towards the pterygopalatine fossa (Fig. 2). In this course, the artery gave rise to the lingual branch anteriorly and the posterior deep temporal artery superiorly. The origin of the former lay proximal to that of the latter in 24 of the 35 examples observed (Fig. 3), distal to that in seven cases and at the same level in four cases. The origin of the latter, however, in all the cases mentioned, was located on the superior wall of the convex part of the maxillary artery when it bent anteromedially on the venter of the lower head (Figs. 2, 3, 11, 15).

1. Posterior deep temporal artery

This artery (0.7-1.6, M. 1.06 mm in diameter) ascended between the mandibular ramus and the lateral surface of the middle of the venter of the lateral pterygoid muscle (Figs. 2, 3) along the posterior margin of the insertion of the deep temporal muscle up to the lower margin of the zygomatic arch beyond the height of the mandibular notch. It then entered the deep temporal medial to its tendon together with the deep temporal nerve, bent slightly posteriorly within the muscle divided into the superior, the posterosuperior and the posterior branches (Figs. 2, 3, 12).

Branches :

1) Anterior branches (Fujimoto 1959, in the dog)

This branch (0.3-0.8, M. 0.54 mm), the first branch of the posterior deep temporal, which numbered one in 20 cases (Figs. 4, 5, 7) and two in 15 cases (Figs. 3, 5), arose from its anterior wall, or rarely from the superior wall of the maxillary artery, proximal or distal to the origin of the masseteric artery. It immediately gave rise to the lateral pterygoid branch medially in five cases (Fig. 7), ran anterosuperiorly towards the posterior margin of the insertion of the temporal muscle to enter it (Fig. 3), and gradually bent anteriorly, giving off small twigs superomedially and inferiorly intramuscularly. These twigs perforated the anterior margin of the muscle. The main stream of the anterior branch continued to run anteriorly between the temporal and the zygomaticomandibular muscles, then laterally between the coronoid process and the latter. It finally came to the anterior margin of the zygomaticomandibular muscle (Fig. 2). En route it gave off twigs to its insertion medially and anteriorly, anastomosing with the peripheries of the buccal artery. The anterior branch which was underdeveloped

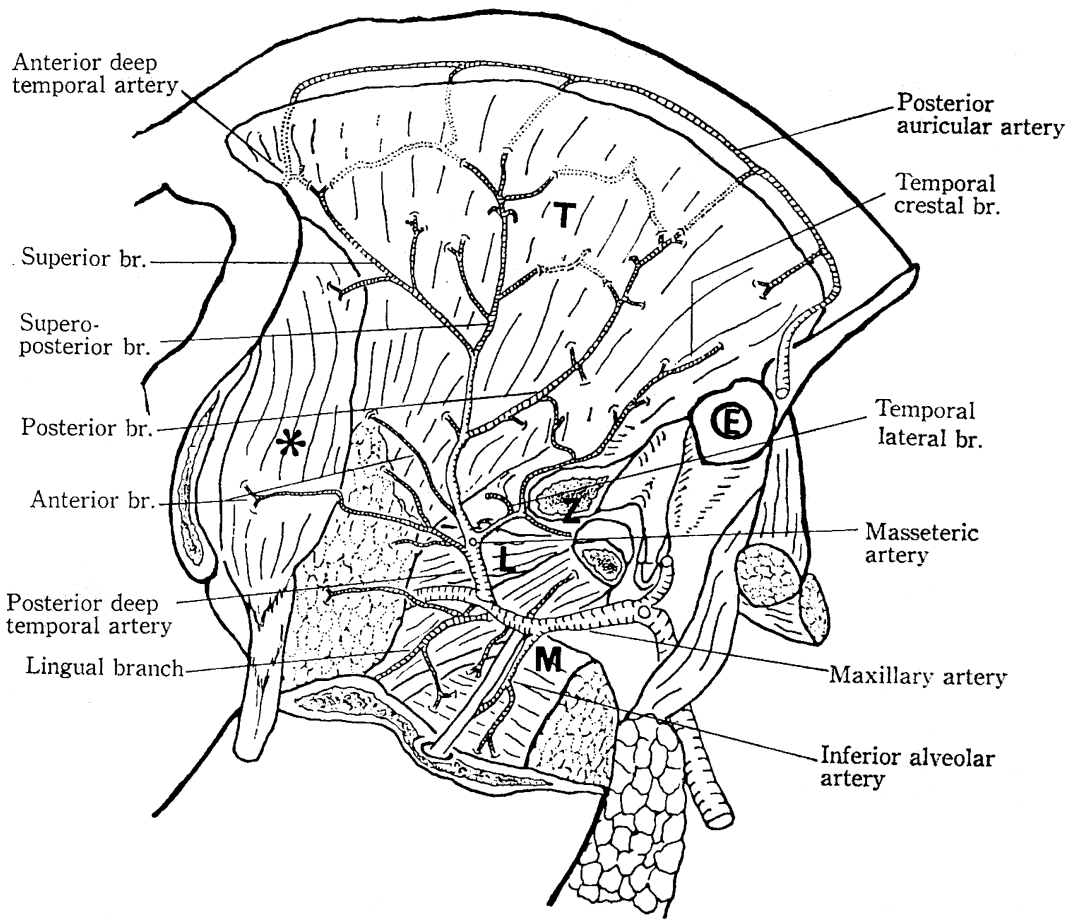

Fig. 1. Schematic illustration of the whole ramification of the posterior deep temporal artery in the crab-eating monkey. See key to abbreviations on page 358. The asterisk indicates the zygomaticomandibular muscle.

in some cases (Fig. 5) supplied only the medial surface of the deep temporal muscles.

In the 15 cases where two anterior branches were seen (Figs. 3, 15), the proximal was always stronger and displayed the features mentioned above. The distal arose from the anterior wall of the parent artery between the points of its origin and the masseteric artery in eight cases, from the superolateral wall of the maxillary artery right distal to the origin of the posterior deep temporal artery in five cases, and from the medial wall of the posterior deep temporal right distal to the origin of the masseteric in two cases. In the five cases where the anterior branch arose from the maxillary, it was similar to the usual vessel in its course and distribution area. In the other eight and two cases, the branch arising from the posterior deep temporal ran anterosuperomedially towards the posterior margin of the insertion of the deep temporal muscle to enter it and spread anterosuperiorly, i.e. to the superior area of the distribution territory of the usual anterior branch, anastomosing with the superior branch and the anterior deep temporal artery intramuscularly.

2) Lateral pterygoid branch

This branch (0.4-0.6, M. 0.46 mm) numbered one in 30 of the 35 examples observed, and two in five cases. It arose from the parent artery between the points of its origin and the masseteric artery in 16 cases, distal to the origin of the masseteric in one case (Fig. 14), and the same level as its origin in three cases (Fig. 7). It arose from the masseteric in six cases (Figs. 6, 8), and from the anterior branch in four cases.

Each of the origins mentioned above lay between the upper margin and the venter of the upper head of the lateral pterygoid, and left medially the anteromedial or medial wall of the parent artery.

The branch, giving off small twigs to the deep temporal muscle from its posterior margin, ran anteromedially. It finally divided into the superior and anterior branches on the lateral side of the upper head of the lateral pterygoid. The former branch bent anteromedially between the upper head and the deep temporal muscle onto the superior surface of the head up to a small ridge (corresponding to the infratemporal crest in man) above the origin of the head. Its peripheries anastomosed with the muscular branch of the middle meningeal (Fig. 7). The latter branch ran anterosuperomedially between the venter of the upper head and the deep temporal muscle and gave off small twigs to the origin of the head medially.

The branch arising from the anterior branch ran medially to the lateral surface of the upper head. The branch arising from the masseteric artery (Figs. 6, 8) ran anteromedially above the upper head and turned to the superior branch since its origin usually lay higher.

In the five cases where the branches were seen to number two, one arose distal to the origin of the masseteric artery and ran medially as the superior branch above the upper head, and the other ran medially as the anterior branch.

3) Masseteric artery

This artery (0.4-0.7, M. 0.61 mm in diameter) arose posteriorly or posterolaterally from the posterior (Figs. 3, 15), the lateral (Fig. 2) or the posterolateral (Figs. 7, 8) wall of the posterior deep temporal in the height of the

mandibular notch in 34 of the 35 examples observed. In the remaining case (Fig. 5), it arose from the superior wall of the maxillary right proximal to the origin of the posterior deep temporal and ascended in contact with it. The artery ran posteriorly along the inferior margin of the temporal muscle and medial to the maxillomandibular muscle up to a point in front of the temporomandibular capsule (Fig. 7), where it gave rise to the temporal crestal branch superoposteriorly (Figs. 3, 11, 15).

The artery ran posterolaterally beneath the maxillomandibular muscle, and continued to run laterally, lateral to the insertion of the upper head of the lateral pterygeid, above the same named vein and anterosuperior to the same named nerve. The artery finally divided into the anterior, the anteroinferior and the posterior branches, all of which ran laterally beyond the notch (Fig. 7), lateral to the maxillomandibular and suporomedial to the anterior and posterior parts of the deep masseter. In cases where two masseteric arteries were seen (11 cases), the proximal divided into the anteroinferior and the anterior branches, and the distal turned to the posterior branch in five cases; the proximal turned to the anteroinferior branch and the distal divided into the anterior and the posterior branches in four cases (Fig. 8), and the proximal divided into the anteroinferior and the posterior branches and the distal turned to the anterior branch in two cases.

a) The anterior branch (Figs. 5, 7, 8, 10)

This branch (0.3-0.5, M. 0.40 mm), giving off small twigs to the anterior part of the deep masseter, ran anterosuperiorly between it and the mandibular ramus, and supplied the insertion of the maxillomandibular muscle from its inferior margin.

b) Anteroinferior branch (Figs. 5, 7, 8, 9, 10)

This branch (0.4-0.6, M. 0.52 mm), the thickest of the three terminal branches, bent anteroinferiorly beyond the notch together with the masseteric nerve, and divided into the medial and lateral branches. The former, giving off twigs to the anterior and posterior parts of the deep masseter, ran anteroinferiorly between both parts on the mandibular ramus and anastomosed with masseteric branches of the transverse facial and the facial arteries at the anteroinferior end of the insertion of the deep masseter. The latter, together with the nerve, following the course of the former, coming to a position between the deep and the intermediate masseter, to supply them and the insertion of the zygomatico- mandibular muscle, where it anasto- mosed with masseteric branches of the buccal and the transverse facial (distal branch of Matsukawa 1969) (Figs. 9, 10).

c) Posterior branch (temporomandibular joint branch of Castelli et al. 1965) (Figs. 5, 7, 8, 9, 10)

This branch (0.2-0.3, M. 0.27 mm), the thinnest, ran posteriorly along the inferior margin of the lateral surface of the temporomandibular joint, and supplied it and the posterior part of the deep masseter, anastomosing with the joint branch of the transverse facial (Fig. 9).

4) Temporal crestal branch

This branch (0.3-0.6, M. 0.52 mm), which was seen in all 35 examples, arose from the posterior wall of the masseteric artery in 28 cases (Figs. 2, 3, 8, 15), and from the posterior wall of the posterior deep temporal distal to the origin of the masseteric in eight

cases (Fig. 14).

It ran posteriorly between the maxillomandibular and the posteroinferior margin of the insertion of the deep temporal muscle and reached a point in front of the joint capsule, giving off twigs to the capsule and the insertion of the lateral pterygoid (Fig. 14). It then continued to run along the anterior margin of the root of the zygomatic process of the temporal bone (Figs. 3, 11), where it gave rise to the temporal lateral branch anteriorly in 26 cases (Fig. 11). The main stream next passed posterosuperiorly between the maxillomandibular and the superficial temporal muscles to supply the origins of these muscles, anastomosing with the posterior branch of the posterior deep temporal intramuscularly (Fig. 12).

In one case, it entered the bone structure via a small foramen on the root of the process (Fig. 14).

The temporal lateral branch (Ikenoya 1960, in man), which was one in number, arose anterosuperolaterally from the lateral wall of the temporal crestal branch in 26 cases (Figs. 3, 11), from the anterolateral wall of the posterior deep temporal distal to the origin of the crestal branch in six cases, and from the lateral wall of the masseteric in three cases (Fig. 8). The branch in the above-mentioned cases arched superiorly along the superior margin of the coronoid process within the maxillomandibular muscle or between this muscle and the insertion of the superficial temporal muscle to supply them. The branch in the other nine cases was well developed with a wider supply area. It bent laterally along the posteroinferior margin of the venter of the temporal muscle (Fig. 11) and ran anterosuperiorly between the maxillomandibular and the superficial temporal. It came to a point lateral to the superior end of the coronoid process and gave off two or three twigs to the superficial temporal muscle, anastomosing with the anterior deep and the superficial temporal arteries, the superior and the superoposterior branches intramuscularly (Fig. 11). The main stream descended to supply the insertion of the superficial temporal and the maxillomandibular muscles, anastomosing with the peripheries of the buccal artery (Fig. 10, 11).

5) Superior branch (Fujimoto, in the dog)

This branch (0.3-0.9, M. 0.53 mm) spread arborescently to supply the anterior one third of the temporal muscle (Figs. 2, 3, 12, 13), and its peripheries perforating its anterior margin ran towards and behind the origin of the zygomaticomandibular muscle to supply it, anastomosing with the anterior deep temporal. Some of them perforated laterally the aponeurosis of the muscle into the superficial temporal, anastomosing with the temporal lateral branch. An arterial loop was formed along the linea temporalis and these these branches and the communications between them (Fig. 12).

6) Superoposterior branch (Fujimoto, in the dog)

This branch (0.5-1.0, M. 0.66 mm), the thickest, followed a course which was a continuation of the posterior deep temporal artery, bending superoposteriorly in the middle of the deep temporal muscle to supply it arborescently (Figs. 2, 3, 11, 12). Its peripheries communicated with the arterial loop mentioned above at the temporal crest extramuscularly.

En route it gave off a twig which spread in the superficial temporal superiorly and inferiorly to supply it, anas-

tomosing with the middle temporal artery of the superficial temporal (Figs. 11, 12) and the temporal lateral branch (Fig. 11).

7) Posterior branch (Fujimoto, in the dog)

This branch (0.3-0.7, M. 0.56 mm), the thinnest, ran posteriorly within the deep temporal muscle above the temporal crest and arborescently supplied its venter (Figs. 2, 3, 12, 13), except the posterior area supplied by the posterior auricular and the superficial temporal arteries. The distribution territory of this branch was larger in 29 cases, while the area supplied by the above-mentioned other arteries was smaller. Its distribution territory in the other 16 cases was smaller but that of the latter was larger (Fig. 12). The peripheries of the branch within the deep temporal muscle communicated with the superoposterior branch and the posterior auricular artery and supplied the maxillomandibular muscle inferiorly, anastomosing with the temporal crestal branch intramuscularly (Fig. 12). The branch in one case gave off a small twig on its inferior wall, immediately after its origin, which supplied the anterior surface of the joint capsule, and the insertion of upper head of the lateral pterygoid.

2. Lingual branch

This branch (0.4-0.8, M. 0.60 mm), which was seen in all 35 examples observed, arose anteriorly, in front of the meeting point between the inferior margin of the lower head of the lateral pterygoid and the posterior margin of the medial pterygoid, from the inferior wall of the maxillary proximal to the origin of the posterior deep temporal in 27 cases (Figs. 3, 4, 15) and distal to it in eight cases (Figs. 2, 14). The branch ran anteriorly along and superolateral to the lingual nerve, between the posterior margin of the insertion of the deep temporal muscle and the lower head of the lateral pterygoid, and then between the medial pterygoid and the insertion of the temporal. Giving off small twigs to the venter of the medial pterygoid and the insertion of the temporal, it passed anteriorly up to the anterior margin of the medial pterygoid, where it divided into two. One branch supplied the buccinator muscle from its posterior side and further the oral mucosa attached to the muscle after perforating it, and the other bent medially in contact with the anterior margin of the medial pterygoid to enter the oral submucous layer and ran anteriorly to supply the lingual gingivae of the lower molar teeth, the posterior margin of the origin of the mylohyoid muscle and the sublingual gland.

The branch, very close to its origin, gave off one or two small twigs from its superior wall medially, which supplied the venter of the lower head of the lateral pterygoid. However, such twigs were not seen in four cases, and similar twigs arose directly from the maxillary (Figs. 2, 14). The parent branch divided into the superior and inferior branches at the inferior margin of the insertion of the deep temporal. The former supplied the inferior part of its insertion (Figs. 2, 15) and the latter supplied the venter of the medial pterygoid after crossing the lingual nerve (Figs. 3, 11, 15).

Discussion

In 1978, the present author and his coworkers prepared detailed descriptions of the posterior deep temporal artery of the dog. The author now wishes to discuss this artery, especially in the dog and man, from the comparative viewpoint.

The general course of the maxillary

artery is located between the mandible and the lateral pterygoid muscle and lateral to the mandibular nerve, although some scholars have reported that the artery sometimes passes medial to these structures. In the rhesus monkey, Castelli et al. (1965) found that the maxillary artery passed medial to the neck of the condyle towards the pterygoid palatine fossa in contact with the lateral surface of the lateral pterygoid muscle. Such a case in which the maxillary passed medial to the muscle was not seen in the dog and crab-eating monkey by Suwa et al. (1978, and the present paper). In man, the maxillary artery gave rise to the middle meningeal, the inferior alveolar and the posterior deep temporal arteries in that order in the temporomandibular joint region, as reported by Takarada (1958), Ikakura (1961) and Kubota (1966). In the dog, Fujimoto (1959), Wakimaru (1959) and Suwa et al. reported that the first artery was replaced by the last one as regards their origins. In the crab-eating monkey, the present author found that the first artery was located between the middle and last ones as reported by Castelli et al.

Concerning the origin of the posterior deep temporal artery in man, the above workers stated that it arose from the superior, rarely the inferior or the superolateral wall of the maxillary in the height of the inferior margin of the lateral pterygoid muscle, forming an angle of 30-60° with respect to the maxillary artery. Concerning the relationships between the posterior deep temporal and the inferior alveolar, both were reported by Takarada, Ikakura and Kubota to arise via a common trunk in few cases in man, as against about half of all examples observed in the dog as reported by Suwa et al. Fujimoto mentioned that both arteries were found to originate separately as the usual type in the dog and cat, and the more the distance between them increased, the more was the emerging point of the inferior alveolar transferred to the inferior, and vice versa the posterior deep temporal to the superior. The origin of the posterior deep temporal or of the trunk was located on the anterior wall of the maxillary in most cases. In the present study, both arteries of the crab-eating monkey did not arise via such a trunk. The posterior deep temporal left the maxillary from its superior wall at right angles, while the inferior alveolar left from its inferior wall independently. The origin of the posterior deep temporal was always to be separate from that of the inferior alveolar, as pointed out by Fujimoto in the dog and cat.

The posterior deep temporal artey arose in common with the masseteric artery in many cases. The masseteric, the temporomandibular joint and the temporal lateral branches (Ikenoya) have been referred to as the branches of the posterior deep temporal by many scholars. In studies in which the nutrient arterial branches of the temporal muscle were investigated in some mammals, Fujimoto described the anterior branch, the masseteric artery, the superior and superoposterior and the posterior branches. Suwa et al. also described, in addition to these branches, the lingual, the temporomandibular joint and the lateral pterygoid branches in the dog.

The anterior branch demonstrated by Fujimoto in the dog was also distributed to the maxillomandibular muscle and the insertion of the temporal muscle in the monkey. However, Suzuki (1975) who made observations on the blood supply of the masseter muscle of the crab-eating monkey, did not mention such a supply territory.

The lateral pterygoid branches were larger than these of the dog, and their origins were seen on the parent artery

and its branches. Those of the monkey, generally well-developed, and the similar branches of the middle meningeal were the important supply route for this muscle. Castelli et al. also reported that the muscle was supplied by the pterygoid artery of the posterior deep temporal and small muscular branches of the maxillary.

The masseteric artery in man arose in common with the posterior deep temporal in about 85% of cases, or rarely directly from the maxillary, according to the reports of Takarada, Ikakura and Kubota. Fujimoto indicated that the masseteric in the human fetus arose in common with the posterior deep temporal in 13 of 15 examples observed and from the maxillary in the other two cases. However, Sicher (1965) stated that the artery left the maxillary in man. Fujiwara (1976) reported that the artery in the human fetus arose from the maxillary artery in contact with the posterior deep temporal in all 17 examples observed. Suwa et al. (1978, and the present paper) found that the artery arose in common with the posterior deep temporal in the dog and monkey except for one case in the monkey where it arose from the maxillary. Castelli et al. also stated that small masseteric and capsular arteries arose near the origin of the posterior deep temporal in the monkey.

According to the lamination of the masseter muscle attempted by Yoshikawa (1962), the present author has made observations on the blood supply of this muscle from many branches of the posterior deep temporal and the masseteric

Table 1. Muscular branches of the posterior deep temporal artery of the crab-eating monkey.

Branches	Supply for the muscles		
	masseter	lat. pterygoid	temporal
1. Anterior br.	zygomaticomand.	upper head	profundus
2. Lateral pterygoid br.		upper head	profundus
3. Masseteric artery			
a) Anterior br.	profundus (pars ant.) maxillomand.		
b) Anteroinferior br.			
medial	profundus (partes ant. et post.)		
lateral	profundus (partes ant. et post.)		
	intermedius		
	zygomaticomand.		
c) Posterior br.	profundus (pars post.)		
4. Temporal crestal br.	maxillomand.	upper head	superficialis profundus
Temporal lateral br.	maxillomand.		superficialis
5. Superior br.	zygomaticomand.		superficialis profundus
6. Superoposterior br.			superficialis profundus
7. Posterior br.			superficialis profundus

arteries, as well on that of the temporal and the lateral pterygoid muscles, as summarized in Table 1.

Suzuki (1975) reported that the masseteric artery of the crab-eating monkey was well-developed, and arising from the posterior deep temporal, supplied a large twig to the maxillomandibular muscle, the deep and intermediate layers, and partly the superficial layer. The present author found that the masseteric artery of the monkey was weak, contrary to Suzuki's descriptions, and that it did not extend beyond the intermediate up to the superficial layer, although it was well-developed in the dog and cat as noted by Castelli et al. To supplement this vessel, however, masseteric brancees arising from other arteries and entering the muscle behind the mandibular ramus, formed a distinctive featuae.

The temporal crest named by the present author was not seen so clearly in the dog and cat as in the crab-eating monkey. The crest was a continuation of the upper margin of the zygomatic arch posteriorly and transferred to the linea temporalis. Such an obviously developed crest in the monkey might be due to the development of a plane area, between the temporal squama and the root of the zygomatic process, where the maxillomandibular muscle was located. The temporal crestal branch corresponded to "the large branch" of the masseteric arteric artery mentioned by Suzuki.

The temporal lateral branch described by Ikenoya in man was a branch of the temporal crestal branch in most cases in the monkey, but not of the maxillary artery, and was distributed mainly to the superficial temporal muscle. Castelli et al. mentioned that the posterior deep temporal artery of the monkey continued upwards to supply the deeper fibers of the temporalis muscle, where it divided into two or three secondary branches which spread out in a fan-shape towards the origin of the muscle. The terminal divisions of the artery in the temporal muscle were named the superior, the superoposterior and the posterior branches in this paper, according to the nomenclature of Fujimoto in the dog and cat. The superoposterior branch was the largest. They anastomosed not beyond the median line, with the posterior auricular artery and the superior branch of the middle temporal artery of Matsukawa et al. (1969). In the monkey, the temporal muscular branches of the posterior deep temporal artery were thus the superior, the superoposterior and the posterior, plus the temporal crestal and the temporal lateral branches.

The present author with coworkers have already given detailed descriptions of the lingual branch in the dog, as shown in man. This branch arises from the inferior alveolar artery in the dog and man. In the crab-eating monkey, however, it was neither a branch of the inferior alveolar nor of the posterior deep temporal, but arose from the maxillary artery, very close to the origin of the posterior deep temporal in all the examples observed. The distribution territory of the branch was similar to that in the dog as described by Suwa et al., but the twig which ran along the inferior alveolar nerve and the branch to the mandibular ramus in the report of Yamamoto et al. (1974), were not seen in the present study.

The medial pterygoid branches described by Tsuji (1969) in some mammals did not arise from the posterior deep temporal in the monkey but from the lingual branch.

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Key to abbreviations

C: Condylar process
E: External auditory meatus
F: Mandibular fossa
M: Medial pterygoid muscle
L: Lateral pterygoid muscle
T: Temporal muscle
Z: Zygomatic arch
i: Inferior alveolar artery
m: Maxillary artery
p: Posterior deep temporal artery
li: Lingual branch
s: Superficial temporal artery
pa: Posterior auricular artery
mm: Middle meningeal artery
tf: Transverse facial artery
mt: Medial pterygoid branch

Branches of the posterior deep temporal artery:

an: Anterior branch
lp: Lateral pterygoid branch
ma: Masseteric artery
a: Anterior branch
b: Anteroinferior branch
c: Posterior branch
tl: Temporal lateral branch
tc: Temporal crestal branch
po: Posterior branch
sp: Superoposterior branch
su: Superior branch
←: Direction of the snout

PLATES

Explanation of Figures

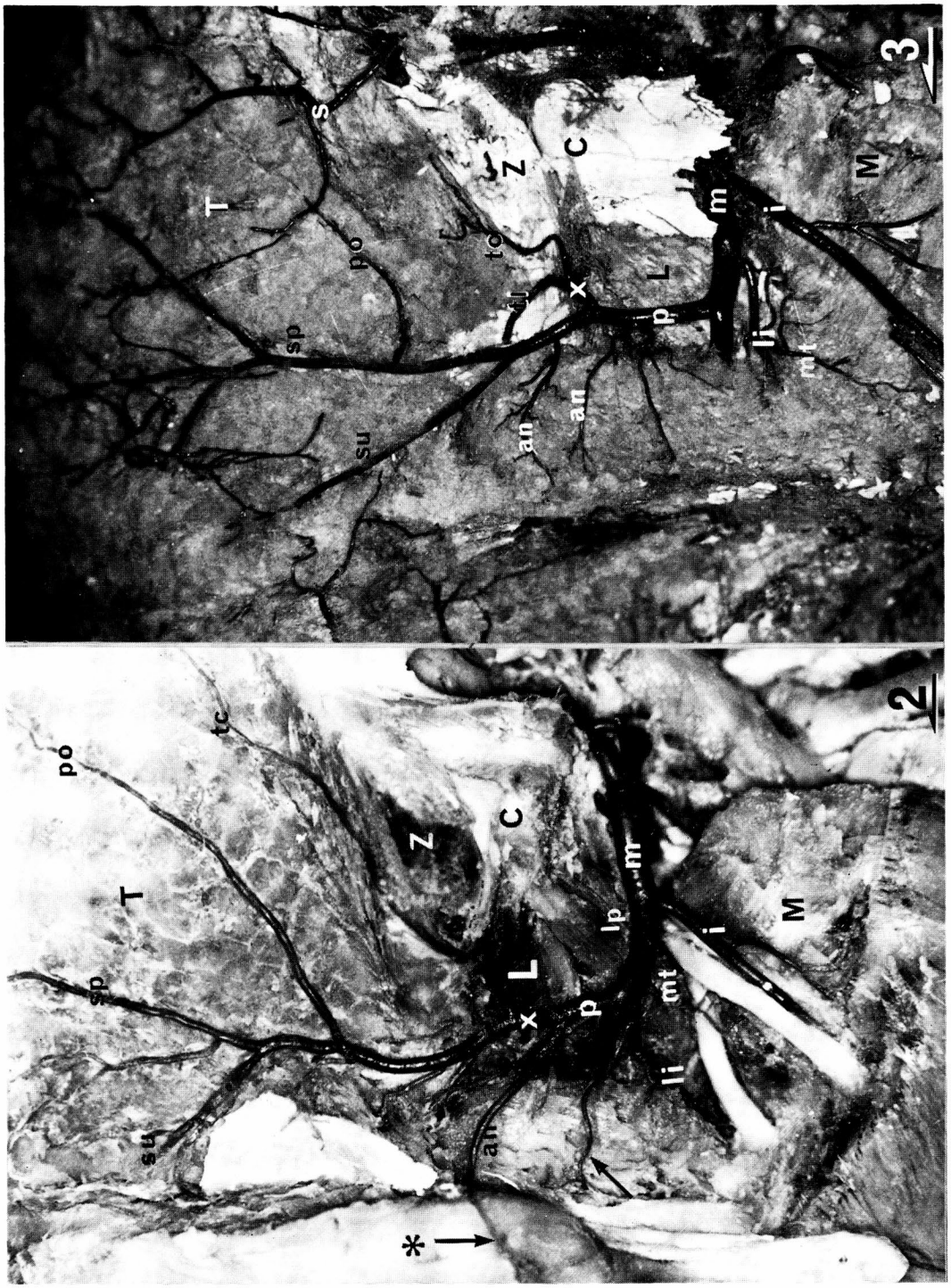
Plate I

Figs. 2 and 3. Lateral view of the mandibular region of the maxillary artery and the origin of the posterior deep temporal artery and its ramification on the left side. A plastic-injected dissection specimen is shown in Fig. 2 (ca. ×2.1), and a corrosion specimen in Fig. 3 (ca. ×2.6).

The posterior deep temporal arises from the maxillary distal to the origin of the inferior alveolar, but the massteric artery has been removed (×) in both figures. The temporal branch was also removed in Fig. 2. The artery divides into the superior, the supero-posterior and the posterior branches arborescently.

The anterior branch in Fig. 2, which was well-developed (↓), supplies the zygomatico-mandibular muscle (*). The lingual branch arises from the maxillary cistal to (in Fig. 2) and medial to (in Fig. 3) the origin of the posterior deep temporal, and gives off a small twig (↗) to the insertion of the temporal muscle. The two anterior branches in Fig. 3 arise both proximal and distal to the origin of the masseteric artery from the posterior deep temporal.

Plate I



F. Suwa

Plate II

Fig. 4. Medial view of the left side. ca. ×1.9.
The maxillary artery gives rise to the inferior alveolar and the middle meningeal arteries, the lingual branch and the posterior deep temporal artery in that order.

Fig. 5. Lateral view of the right side. ca. ×3.3.
The masseteric artery in this case arises directly from the maxillary right proximal to the origin of the posterior deep temporal and ascends in contact with it.

Fig. 6. Superomedial view of the left side. ca. ×3.1.
The lateral pterygoid branch arises from the masseteric.

Fig. 7. Superomedial view of the right side. ca. ×3.4.
The lateral pterygoid branch arises from the posterior deep temporal, from which the masseteric arises posterolaterally and divides into the anterior, the anteroinferior and the posterior branches at the mandibular notch. Communications (←) are seen between the lateral pterygoid branch and the same named branch of the middle meningeal artery.

Plate II

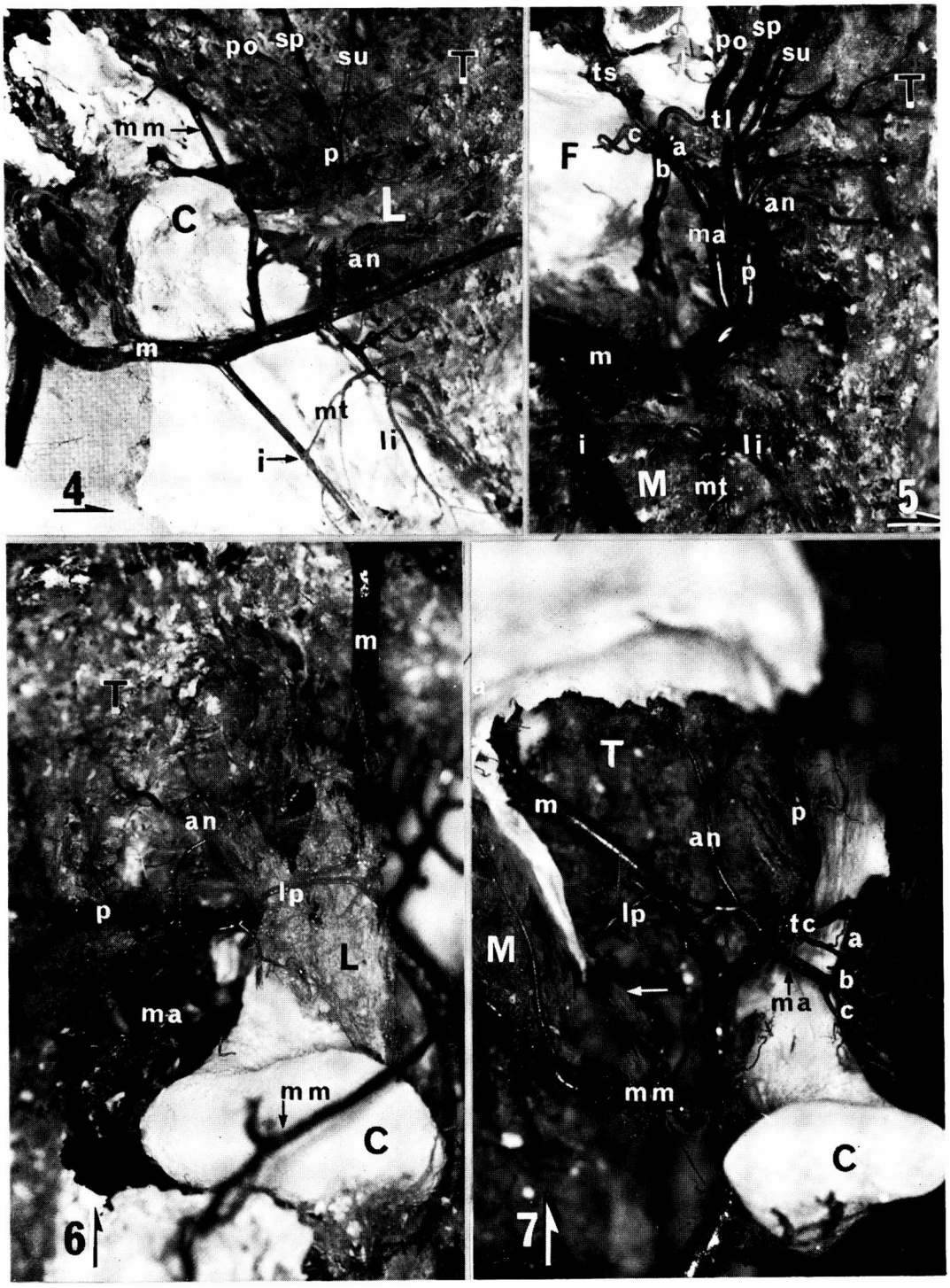


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Plate III

Fig. 8. Anterolateral view of the masseteric artery of the right side. ca. ×3.4.
In this case, two masseteric arteries are seen. The proximal divides into the anteroinferior and anterior branches, and the distal turns to the posterior branch. The temporal lateral, the lateral pterygoid and the temporal crestal branches arise from the masseteric artery, respectively.

Figs. 9 and 10. Lateral view of the mandibular ramus of the right (Fig. 9, ca. ×2.1) and left (Figs. 10, ca. ×1.6) sides.
Communications between the masseteric artery and other arterial branches within the masseter muscle are seen as follows. In Fig. 9, the anteroinferior branch anastomoses (↘) (←) with the peripheries (☆), and the posterior branch anastomoses (↖) with the peripheries of the transverse facial. In Fig. 10, the anteroinferior branch anastomoses (→) with those of the transverse facial. In both figures, the temporal lateral branch anastomoses (↑) with the peripheries of the buccal artery.

Fig. 11. Lateral view of the temporal lateral branch of the left side. ca. ×2.3.
The mandibular ramus and all branches out of the masseteric artery were removed. The temporal lateral branch arises from the masseteric, and anastomoses with the superoposterior branch (←), the peripheries (↑) of the anterior deep temporal and (↖) of the superficial temporal artery.

Plate III

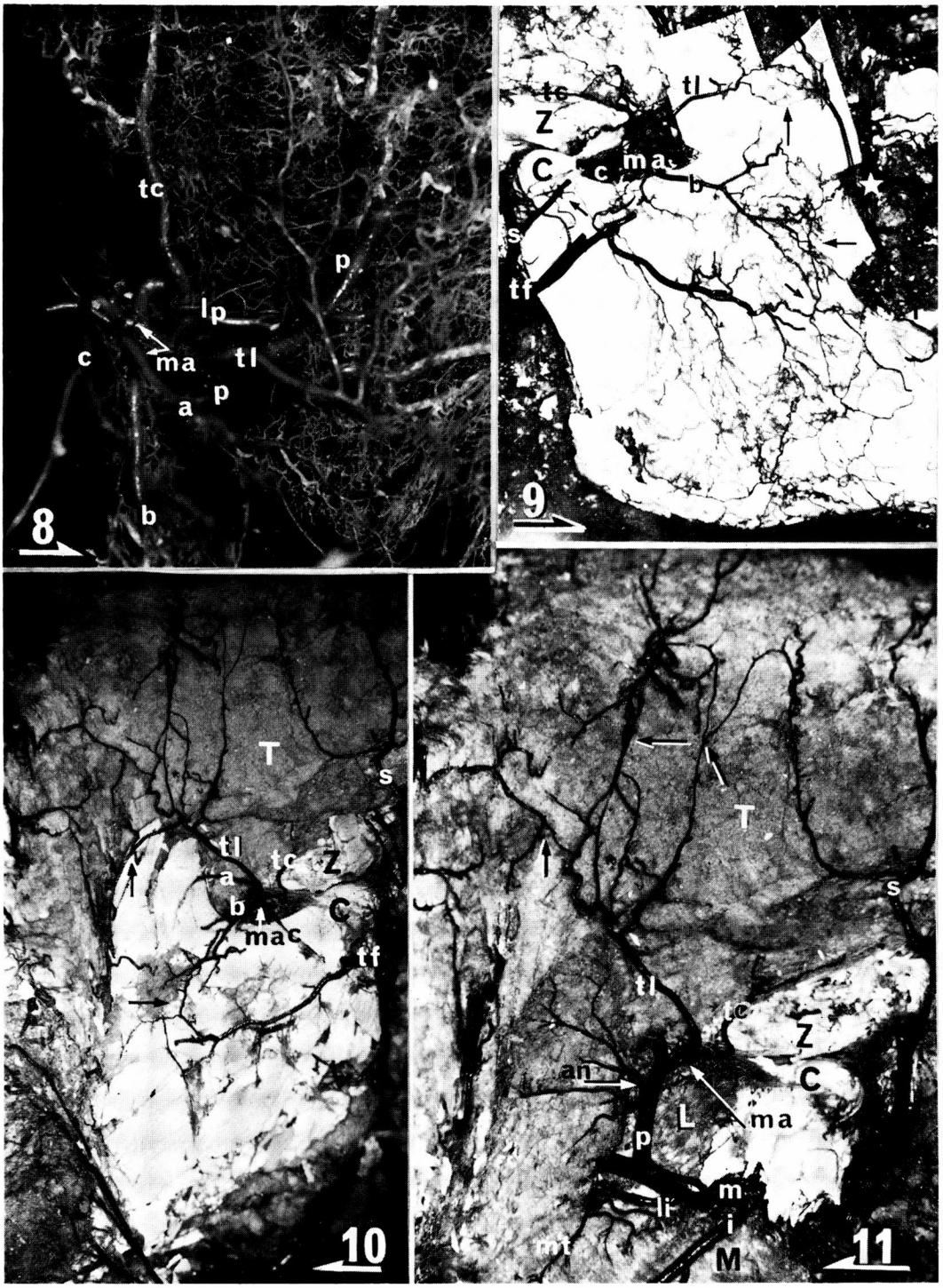
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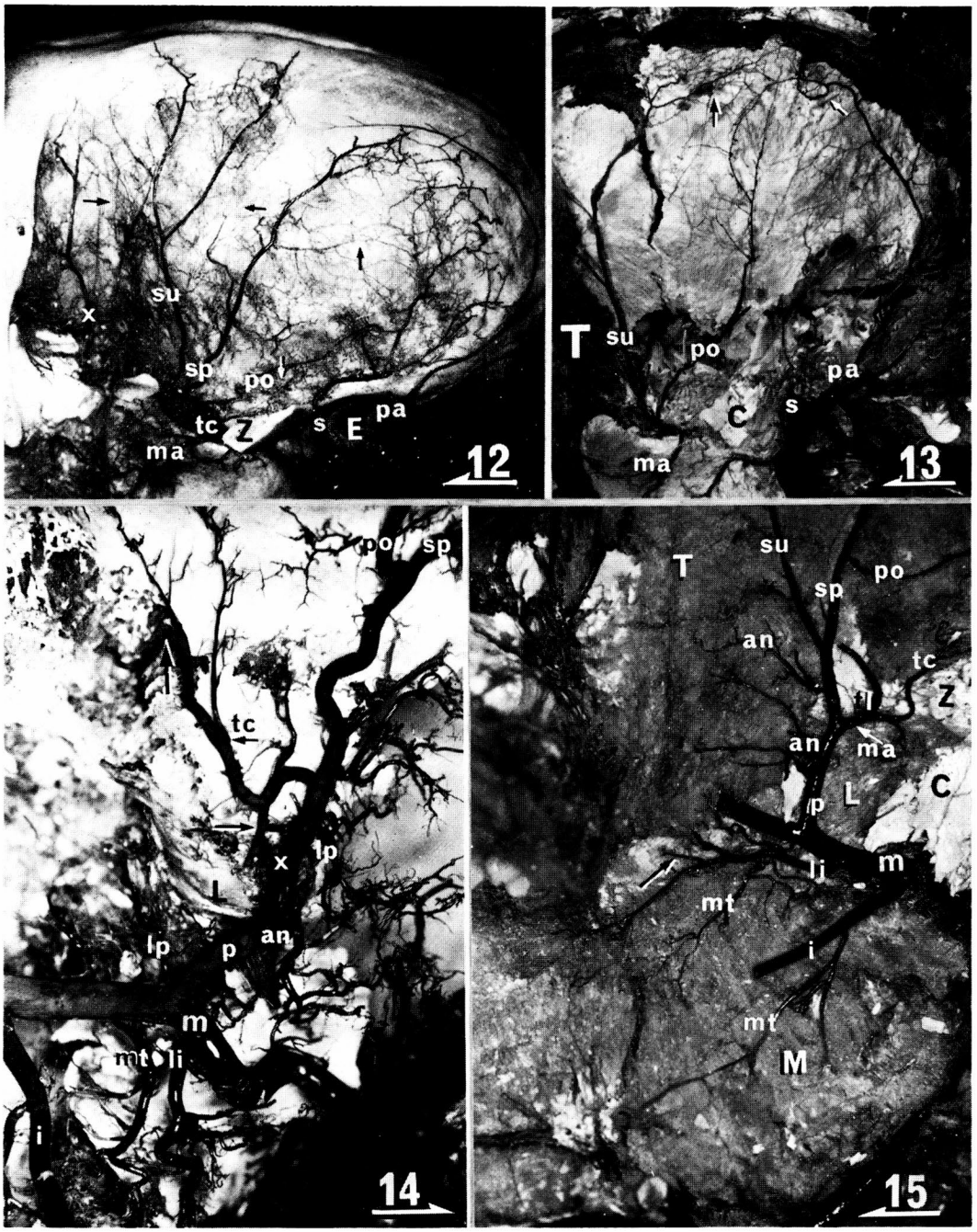
Plate IV

Figs. 12 and 13. Lateral view of the left side. ca. ×1.3, ×1.0.
Communications between various branches in the temporal muscle are seen as follows. In Fig. 12, there are anastomoses (→) between the superior branch and the anterior deep temporal artery (×); (↑) between the superoposterior branch and the superficial temporal artery; (↓) between the posterior branch and the temporal crestal branch; and (←) between the superior and superoposterior branches. In Fig. 13, there are anastomoses (↑) between the superoposterior and posterior branches; and (↖) between the posterior branch and the posterior auricular artery.

Fig. 14. Lateral view of the left side. ca. ×2.9.
The masseteric artery was removed (×). The temporal crestal branch arising from the posterior deep temporal artery gives off a small twig to the temporomandibular joint (→) and enters the temporal bone (↑) via a small foramen on the root of its zygomatic process.

Fig. 15. Lateral view of the left side. ca. ×2.1.
The lingual branch arises from the inferior wall of the maxillary artery distal to the origin of the inferior alveolar, and supplies branches to the venters of both the medial and lateral pterygoid and the insertion of the temporal muscle. It runs across the venter of the medial pterygoid and supplies the oral mucosa, the lingual gingivae of the lower molar teeth and the posterior margin of the mylohyoid muscle beyond the anterior margin of the medial pterygoid muscle. A twig of the lingual branch supplies the insertion of the deep temporal (↗).

Plate IV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