CHAPTER 12

The Linguofacial Collateral Pattern

Ontogenetically this pattern corresponds to the external carotid system proper. It results from the late development of the ventral pharyngeal artery of the human embryo. Only secondarily it annexes the occipitopharyngeal arteries and what was the stapedial artery to give the external carotid system its ultimate aspect. In addition, the oral origin of part of the thyroid tissue predicts the role played by the superior thyroid artery in the collateral circulation of the linguofacial area.

As the ventropharyngeal territory lies on the midline, it receives a bilateral supply and will therefore recruit its collateral circulation from both sides. However, two routes of resupply to the area (floor of the mouth), the submental and sublingual arteries, remain the crucial characteristics of this pattern. It is understandable that the congenital disposition of the submental artery (see Chapter 5) will constitute the key information needed for predicting further development of the collateral circulation (Figs. 12.1, 12.2).

The vascularization of the cheek develops late during ontogenesis; it then receives its supply from a triple hemodynamic balance: internal maxillary, transverse facial and facial.

In clinical practice, proximal elementary constraints on the facial artery (surgical ligations or proximal embolizations) are frequent (Fig. 12.3). In such situations, ipsilateral collateral circulation is recruited, unless the constraint is applied distal to the facial origin of the submental artery. In a similar fashion, occlusion of the proximal lingual artery (as in cancers of the base of the tongue extending to the posterior portion of the floor of the mouth) will develop the sublingual collateral pathways (Fig. 12.4). Simultaneous proximal occlusions of both lingual and facial arteries or occlusion of a congenital faciolingual common trunk will recruit ipsilateral collateral pathways from the superior thyroid branches (Fig. 12.5), unless the submental and hyoid branch of the lingual artery are involved by the occlusion. If the occlusion is applied distal to their origin, contralateral collateral circulation via both sublingual and submental anastomoses will provide the only efficient collateral circulation (Fig. 12.6). A similar response occurs when the superior thyroid artery is not congenitally developed. Finally, following a superficial facial occlusion, arterial need of the cheek will recruit the buccal artery anastomoses (Fig. 12.7), unless the constraint is applied distal to its origin from the facial trunk. Most probably, the superior masseteric arterial flow from the transverse facial artery will, in addition, participate in this collateral circulation (Fig. 12.7).

It is of interest to note how the flow can easily reverse in the above-described anastomoses. Similar observations were made in the proximal occipital trunk. Therefore, a situation in which the proximal facial artery is recruited to supply the floor of the mouth will behave as a functional hemodynamic steal for distal territories. Similar to a ligation proximal to the
Fig. 12.1. Schematic representation of the linguofacial pattern viewed from the side and anteriorly. Two basic theoretical situations are illustrated. A The proximal facial occlusion (asterisk) induces the lingual (arrow) enlargement to supply the facial trunk through the sublingual anastomosis (curved arrow). B Proximal lingual occlusion (asterisk) induces facial (arrow) enlargement to supply the lingual trunk through the submental and sublingual anastomosis (broken arrow).

Fig. 12.2. Linguofacial pattern