

Cambridge University Press

978-1-108-07958-7 - The Works of John Hunter, F.R.S.: Volume 2

Edited by James F. Palmer

Excerpt

[More information](#)

## THE NATURAL HISTORY

OF

## THE HUMAN TEETH.

## PART I.

*Of the Upper Jaw.*

**B**EFORE we enter into a description of the teeth themselves, it will be necessary to give an account of the upper and lower jaw-bones, in which they are inserted; insisting minutely on those parts which are connected with the teeth, or serve for their motion and action, and passing over the others slightly.

The upper jaw is composed of two bones, which generally remain distinct through life. They are very irregular at their posterior and upper parts, sending upwards and backwards a great many processes, that are connected with the bones of the face and skull\*. The lower and anterior parts of the upper jaw are more uniform, making a kind of circular sweep from side to side, the convexity of which is turned forwards; the lower part terminates in a thick edge, full of sockets for the teeth. This edge is called in each bone the alveolar process†. Behind the alveolar processes there are two horizontal lamellæ, which uniting together, form part of the roof of the mouth, which is the partition between the mouth and the nose‡.

This plate, or partition, is situated about half an inch higher than the lower edge of the alveolar process; and this gives the roof of the mouth a considerable hollowness.

The use of the upper jaw is to form part of the parietes of the mouth, nose, and orbits; to give a basis, or supply the alveolar process, for the

\* Pl. II. f. 1 & 2. *a, a.*  
VOL. II.

† Pl. I. f. 1. *a, b, c, d.*  
B

‡ Pl. I. f. 1. *e, e.*

superior row of teeth, and to counteract the lower jaw; but it has no motion itself upon the bones of the head and face.

### *Of the Lower Jaw.*

As the lower jaw is extremely moveable, and its motion is indispensably necessary in all the various operations of the teeth, it requires to be more particularly described. It is much more simple in its form than the upper, having fewer processes, and these not so irregular. Its anterior circular part is placed directly under that of the upper jaw; but its other parts extend further backwards\*.

This jaw is at first composed of two distinct bones †; but these, soon after birth, unite into one, at the middle of the chin. This union is called the symphysis of the jaw. Upon the upper edge of the body of the bone is placed the alveolar process, a good deal similar to that of the upper jaw. The alveolar process extends all round the upper part of the bone, from the coronoid process of one side to that of the other ‡. In both jaws they are everywhere relatively proportional to the teeth, being thicker behind, where the teeth are larger and more irregular, upon account of the more numerous fangs inserted into them. The teeth that are situated backwards in the upper jaw, have more fangs than those that correspond with them in the lower, and the sockets are accordingly more irregular. The alveolar process of the upper jaw is a section of a larger circle than that of the lower, especially when the teeth are in the sockets. This arises chiefly from the anterior teeth in the upper jaw being broader and flatter than those in the lower §. The posterior part of the bone on each side rises almost perpendicularly, and terminates above in two processes ||; the anterior of which is the highest, is thin and pointed, and is called the coronoid process ¶. The anterior edge of this process forms a ridge, which goes obliquely downward and forward on the jaw, upon the outside of the posterior sockets \*\*. To this process the temporal muscle is attached; and as it rises above the centre of motion, that muscle acts with nearly equal advantage in all the different situations of the jaw.

The posterior process, which is made for a moveable articulation with the head, runs upward, and a little backward; is narrower, thicker, and shorter than the anterior; and terminates in an oblong rounded head, or condyle ††, whose longest axis is nearly transverse. The condyle is

\* Pl. II. f. 1 &amp; 2.

† Pl. VI. f. 1, 4, &amp; 6.

‡ Pl. I. f. 2.

§ Pl. II. f. 1.

|| Pl. II. f. 2. e &amp; d; and Pl. III. f. 2. e &amp; f.

¶ Pl. III. e, e.

\*\* Pl. II. f. 2, b.

†† Pl. III. f. 2. f.

## OF THE HUMAN TEETH

3

bent a little forward; is rounded, or convex, from the fore to the back part; and likewise a little rounded from one end to the other, or from right to left. Its external end is turned a little forward, and its internal a little backward; so that the axes of the two condyles are neither in the same straight line, nor parallel to each other; but the axis of each condyle, if continued backwards, would meet, and form an angle of about one hundred and forty-six degrees; and lines drawn from the symphysis of the chin to the middle of the condyle would intersect their longest axis at nearly right angles\*. There are, however, some exceptions, for in a lower jaw of which I have a drawing, the angle formed by the supposed continuation of the two axes, instead of being an angle of one hundred and forty-six degrees, is of one hundred and ten only. The lower jaw serves for a base to support the teeth in the alveolar process during their action on those of the upper jaw in mastication, and to give origin to some muscles that belong to other parts.

*Of the Alveolar Processes.*

The alveolar processes are composed of two thin bony plates, one external† and the other internal‡. These two plates are at a greater distance from each other at their posterior ends, than at the anterior, or middle part of the jaw. They are united together by thin bony partitions going across, which divide the processes at the anterior part into just as many distinct sockets as there are teeth§; but at the posterior part, where the teeth have more than one root or fang, there are distinct cells or sockets for every root||. These transverse partitions are more protuberant than the alveolar plates, and thus add laterally to the depth of the cells, particularly at the anterior part of the jaw. At each partition the external plate of the alveolar process is depressed, so as to form a fluting¶ round the cells or cavities for the roots of the teeth. This is observable in the whole length of the alveolar process of the upper jaw, and in the fore part particularly of the lower jaw. The alveolar processes of each jaw form about one half of a circular, or rather of an elliptical\*\*, figure; and at the fore part in the lower jaw they are perpendicular, but project inwards at the posterior part, and describe a smaller circle than the body of the bone upon which they stand††, as we shall observe more particularly hereafter, when we come to treat of the jaws of old people.

\* Pl. I. f. 2., or Pl. III. f. 2.

† Pl. I. f. 1. *b, b, b.*|| Pl. I. f. 1. *d, d,* and f. 2. *b.*

\*\* Pl. I. f. 1, 2.

† Pl. I. f. 1. *a, a, a, a, a.*§ Pl. I. f. 1. *c, c,* and f. 2. *a.*¶ Pl. II. f. 2. *f, f, f, f, f.*

†† Pl. I. f. 2.

The alveolar processes of both jaws should rather be considered as belonging to the teeth than as parts of the jaws; for they begin to be formed with the teeth, keep pace with them in their growth, and decay and entirely disappear when the teeth fall out; so that if we had no teeth, it is likely we should not only have no sockets, but not even these processes in which the sockets are formed; for the jaws can perform their motions, and give origin to muscles, without either the teeth or alveolar processes. In short, there is such a mutual dependence of the teeth and alveolar processes on each other, that the destruction of the one seems to be always attended with that of the other<sup>a</sup>.

In the head of a young subject which I examined, I found that the two first incisor teeth in the upper jaw had not cut the gum, nor had they any root or fang, excepting so much as was necessary to fasten them to the gum, on their upper surface; and on examining the jaw, I found there was no alveolar process nor sockets in that part. What had been the cause of this I will not pretend to say; whether it was owing to the teeth forming not in the jaw but in the gum, or to the wasting of the fangs. The appearance of the tooth favoured the first supposition, for it was not like those whose fangs are decayed in young subjects, preparatory to the shedding of the teeth; and as it did not cut the gum, it is reasonable to think it never had any fang. That end from which the fang should have grown was formed into two round and smooth points, having each a small hole leading into the body of the tooth, which was pretty well formed.

#### *Of the Articulation of the Lower Jaw.*

Just under the beginning of the zygomatic process of each temporal bone, before the external meatus auditorius, an oblong cavity may be observed, in direction, length, and breadth in some measure corresponding with the condyle of the lower jaw\*. Before and adjoining to this cavity, there is an oblong eminence, placed in the same direction, convex upon the top, in the direction of its shorter axis, which runs from behind forwards; and a little concave in the direction of its longer axis, which runs from within outwards. It is a little broader at

\* Pl. I. f. 3. c.

---

<sup>a</sup> [This observation is strictly correct: however rapidly the gum becomes absorbed, whether from indigestion, the use of mercury, the accumulation of calculous matter, or that affection which is vulgarly termed scurvy in the gum, the alveolar process never becomes exposed (unless it be a dead portion exfoliating), but absorption of the bone always keeps pace with that of the gum.]

## OF THE HUMAN TEETH.

5

its outer extremity, as the outer corresponding end of the condyle describes a larger circle in its motion than the inner\*. The surface of the cavity and eminence is covered with one continued smooth cartilaginous crust, which is somewhat ligamentous, for by putrefaction it peels off, like a membrane, with the common periosteum. Both the cavity and eminence serve for the motion of the condyle of the lower jaw. The surface of the cavity is directed downward; that of the eminence downward and backward, in such a manner that a transverse section of both would represent the italic letter *S*†. Though the eminence may, on a first view of it, appear to project considerably below the cavity, yet a line drawn from the bottom of the cavity to the most depending part of the eminence is almost horizontal, and therefore nearly parallel with the line made by the grinding surfaces of the teeth in the upper jaw: and when we consider the articulation further, we shall find that these two lines are so nearly parallel that the condyle moves almost directly forwards in passing from the cavity to the eminence; and the parallelism of the motion is also preserved by the shape of an intermediate cartilage.

In this joint there is a moveable cartilage, which, though common to both condyle and cavity, ought to be considered rather as an appendage of the former than of the latter, being more closely connected with it, so as to accompany it in its motion along the common surface of both the cavity and eminence. This cartilage is nearly of the same dimensions with the condyle, which it covers, and is hollowed out on its inferior surface, to receive the condyle. On its upper surface it is more unequal, being moulded to the cavity and eminence of the articulating surface of the temporal bone, though it is considerably less, and is therefore capable of being moved with the condyle, from one part of that surface to another‡. Its texture is ligamento-cartilagineous. This moveable cartilage is connected with both the condyle of the jaw and the articulating surface of the temporal bone, by distinct ligaments, arising from its edges all round. That by which it is attached to the temporal bone is the most free and loose; though both ligaments will allow an easy motion of the cartilage on the respective surfaces of the condyle and temporal bone. These attachments of the cartilage are strengthened, and the whole articulation secured, by an external ligament, which is common to both, and which is fixed to the temporal bone, and to the neck of the condyle. On the inner surface of the ligament which attaches the cartilage to the temporal bone, and backwards, in the cavity, is placed what is commonly called the gland of the joint; at

\* Pl. I. f. 3. d.

† Pl. I. f. 3. c. d.

‡ Pl. I. f. 3. c.

least the ligament is there much more vascular than at any other part.

*Of the Motion in the Joint of the Lower Jaw.*

The lower jaw, from the manner of its articulation, is susceptible of a great many motions. The whole jaw may be brought horizontally forwards, by the condyles sliding from the cavity towards the eminences on each side. This motion is performed chiefly when the teeth of the lower jaw are brought directly under those of the upper, in order to bite or hold anything very fast between them.

Or, the condyles only may be brought forwards, while the rest of the jaw is tilted backwards, as is the case when the mouth is open; for on that occasion the angle of the jaw is tilted backwards, and the chin moves downwards, and a little backwards also. In this last motion the condyle turns its face a little forwards; and the centre of motion lies a little below the condyle, in the line between it and the angle of the jaw. By such an advancement of the condyles forwards, together with the rotation mentioned, the aperture of the mouth may be considerably enlarged; a circumstance necessary on many obvious occasions.

The condyles may also slide alternately backwards and forwards, from the cavity to the eminence, and *vice versa*; so that while one condyle advances, the other moves backwards, turning the body of the jaw from side to side, and thus grinding between the teeth the morsel separated from the larger mass by the motion first described. In this case the centre of motion lies exactly in the middle between the two condyles. And it is to be observed, that in these slidings of the condyles forwards and backwards, the moveable cartilages do not accompany the condyles in the whole extent of their motion, but only so far as to adapt their surfaces to the different inequalities of the temporal bone: for as these cartilages are hollow on their lower surfaces where they receive the condyle, and on their opposite upper surfaces are convex where they lie in the cavity, but anteriorly, at the root of the eminence, are a little hollowed, if they accompanied the condyles through the whole extent of their motion, the eminences would be applied to the eminences, the cavities would not be filled up, and the whole articulation would be rendered very insecure.

This account of the motion of the lower jaw and its cartilages clearly demonstrates the principal use of these cartilages, namely, the security of the articulation, the surfaces of the cartilage accommodating themselves to the different inequalities, in the various and free motions of this joint. This cartilage is also very serviceable for preventing the

## OF THE HUMAN TEETH.

7

parts from being hurt by the friction; a circumstance necessary to be guarded against where there is so much motion. Accordingly I find this cartilage in the different tribes of carnivorous animals, where there is no eminence and cavity, nor other apparatus for grinding, and where the motion is of the true ginglymus kind only.

In the lower jaw, as in all the joints of the body, when the motion is carried to its greatest extent, in any direction, the muscles and ligaments are strained and the person made uneasy. The state, therefore, into which every joint most naturally falls, especially when we are asleep, is nearly in the middle state between the extremes of motion; by which means all the muscles and ligaments are equally relaxed. Thence it is that commonly and naturally the teeth of the two jaws are not in contact, nor are the condyles of the lower jaw so far back in the temporal cavities as they can go.

*Of the Muscles of the Lower Jaw.*

Having described the figure, articulation, motion, and use of the lower jaw, it will be necessary in the next place to give some account of the muscles that are the causes of its motion.

There are five pairs of muscles, each of them capable of producing various motions, according to the situation of the lower jaw, whether they act singly or in conjunction with others. Two or more of them may be so situated as to be capable of moving the jaw in the same direction; but every motion is produced by the action of more than one muscle at a time. Thus, if the jaw be depressed, and brought to one side, either the masseter, temporal, or pterygoideus internus of the opposite side will not only raise the jaw but bring it to its middle state. It will be necessary in the description of each muscle to give its use in the different situations of the jaw, by which means, after they are all described, their compound actions will be better understood. I shall first describe those which raise the jaw; then those which give it the lateral motion; and lastly, those which depress it; proceeding in the order in which they present themselves in dissection.

The most superficial is the masseter: it is situated upon the posterior and lower part of the face, between the cheek-bone and angle of the lower jaw, directly before the lower part of the ear. It is a thick, short, complex muscle, and a little flattened: it appears to have two distinct origins, an anterior and outer and a posterior and inner; but that is owing only to its outer edge at its origin being slit, or double, and the fibres of these two edges having a different course, decussating each

other a little. The anterior and outer portion of the muscle begins to rise from a small part of the lower edge of the malar process of the maxillary bone, adjoining to the os malæ; and continues its origin all along the lower horizontal edge of this last bone to the angle where its zygomatic process turns up to join that of the temporal bone. The external layer of fibres in this portion is tendinous at its beginning, while the internal is fleshy.

The posterior and inner portion of this muscle begins to rise, partly tendinous and partly fleshy, from the same lower edge of the os malæ: not where the origin of the other portion terminates, but a little further forwards; and this origin is continued along the lower edge of the zygomatic process of the temporal bone, as far backwards as the eminence belonging to the articulation of the lower jaw.

From this extent of its origin the muscle passes downwards to its insertion into the lower jaw. The anterior external portion is broader at its insertion than at its origin; for it occupies a triangular space of the lower jaw; which, above the angle and on the outside, is about an inch in breadth, but below about an inch and a half, from the angle towards the chin. In consequence of this extent of insertion, the fibres of this portion divaricate very considerably. They are mostly fleshy at their insertion, a few only being tendinous, particularly those that are inserted backwards. The posterior and inner portion of the masseter is narrower at its insertion than at its origin; its posterior fibres running forwards as well as downwards, while its anterior run almost directly downwards. It occupies in its insertion the remaining part of the scabrous surface above the angle of the lower jaw, which lies between the anterior portion and the two upper processes, viz. the condyle and coronoid. As the anterior fibres of this portion rise on the inside of the posterior fibres of the other portion, and as its posterior fibres run forwards as well as downwards, and its anterior run almost directly downwards, while the fibres of the other portion radiate both forwards and backwards; these two portions in some measure decussate, or cross one another. The anterior fibres, which run furthest and lowest down, are tendinous at their insertion, while the posterior and shortest are fleshy.

The use of the whole muscle is to raise the lower jaw; and when it is brought forwards, the posterior and inner portion will assist in bringing it a little back: so that this muscle becomes a rotator, if the jaw happens to be turned to the opposite side.

We may observe that this muscle is intermixed with a number of tendinous portions, both at its origin and its insertion; which give rise to a greater number of fleshy fibres, and thereby add to the strength of the muscle.



## OF THE HUMAN TEETH.

9

*Of the Temporal Muscle.*

The temporal muscle is situated on the side of the head, above and a little before the ear. It is a flat and radiated muscle; broad and thin at its origin; narrow and thick at its insertion; and covered with a pretty strong fascia above the jugum.

This fascia is fixed to the bones round the whole circumference of the origin of the muscle. Above, it is fixed to a smooth white line, which is observable upon the skull, extending from a little ridge on the lateral part of the os frontis, continued across the parietal bone, and making a turn towards the mammillary process. It is fixed below to the ridge where the zygomatic process begins, just above the meatus auditorius; then to the upper edge of the zygomatic process itself, and anteriorly to the os malæ. This adhesion above, before and behind, describes, as it were, the circumference of the origin of the temporal muscle.

This muscle arises from all the bones of the side of the head that are within the line for insertion of the tendinous fascia, viz. from the lower and lateral part of the parietal bone, from all the squamous portion of the temporal bone, from the lower and lateral part of the os frontis, from the temporal process of the os sphenoides, often from a process at the lower part of this surface, (which portion, however, is often common to this muscle and the pterygoideus externus,) and from the posterior surface of the os malæ: outwardly, it arises from the inner surface of the jugum, and from the whole inner surface of the fascia. At this origin from the jugum it is not to be distinguished from the masseter, being there in fact one and the same muscle; and indeed the masseter is no more than a continuation of the same origin under the edge of the jugum, and might properly enough be reckoned the same, both as to its origin and insertion, and in some measure in its use also.

The origin is principally fleshy, and the muscle passes from thence downwards and a little forwards, converging, and forming a thin middle tendon: after which the muscle runs downwards on the inside of the jugum, and is inserted into the coronoid process of the lower jaw, on both sides tendinous and fleshy, but principally tendinous. It reaches further down upon the inside of the coronoid process than upon the outside, the insertion being continued as low down as the body of the bone.

The posterior and inferior edge of this muscle passes over the root of the zygomatic process of the temporal bone as over a pulley, which confines the action of the muscle to that of raising the lower jaw more than if its fibres had passed in a direct course from their origin to their insertion.

The use of the temporal muscle, in general, is to raise the lower jaw; and as it passes a little forwards to its insertion, it must bring the condyle at the same time backwards, and so counteract the pterygoideus externus of the opposite side; and if both muscles act, they counteract both the pterygoidei, by bringing back the whole of the jaw.

#### *Of the Internal Pterygoid Muscle.*

The internal pterygoid muscle is situated upon the inside of the lower jaw, opposite to the masseter. It is a strong short muscle, a little flattened, especially at its insertion. It arises tendinous and fleshy from the whole internal surface of the external ala of the sphenoid bone; from the external surface of the internal ala, near its bottom; from that process of the os palati that makes part of the fossa pterygoidea; likewise from the anterior rounded surface of that process where it is connected to the os maxillare superius. From thence the muscle passes downwards, a little outwards and backwards, and is inserted, tendinous and fleshy, into the inside of the lower jaw, from the angle up almost to the groove for the admission of the maxillary nerve, where the surface of the bone is remarkably scabrous.

The use of this muscle is to raise the lower jaw; and from its direction, one would suspect that it would bring the condyle a little forwards; but this motion is contrary to that of the lower jaw, for it is naturally brought back when raised.

#### *Of the External Pterygoid Muscle.*

The external pterygoid muscle is situated immediately between the external surface of the external ala of the pterygoid process and the condyle of the lower jaw, lying, as it were, horizontally along the basis of the skull. It is somewhat radiated in some bodies; broad at the origin, and small at the insertion; but the greater part of it forms a round strong fleshy belly, so that the part that makes it of the radiated kind is thin.

The thick and ordinary portion of it arises, tendinous and fleshy, from almost the whole external surface of the external ala of the pterygoid process of the sphenoid bone, excepting a little bit of the root at the posterior edge; and towards the lower part it arises a little from the inner surface of that ala. The thin portion arises from a ridge of the sphenoid that is continued from the process towards the temple, just behind the foramen lacerum inferius, which terminates in a little pro-