The Cranial Bowl*

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Eight years ago this spring Dr. R. C. McCaughan and the Editor published a series of papers entitled, "Osteopathic Research Imperative." In the third of these papers, in March, 1936, we quoted Dr. Della B. Caldwell as urging the investi-
gation and evaluation of various discoveries made, and methods used, by osteopathic physicians, including the diag-
osis and treatment of cranial conditions as taught by Dr. W. G. Sutherland.

For many years previous to that, Dr. Sutherland had been studying skulls, in fact since his early days in osteo-
pathic college. He examined them dead and dry, on the dissection table, and in his patients, young and old. More recently he has been appearing with greater frequency on con-
vention programs, where the bare outlines of his methods were brought to the attention of increasing numbers of
osteopathic physicians, since no convention sessions are long enough to cover the ground. And he has been giving indi-
vidual instruction to those greatly interested, so that cranial tech

ics is now being practiced by more and more doctors, from coast to coast.

Like any other specialty in osteopathy, cranial technic is not to be learned from casual observation, or even from
study of an article or two in a magazine. Therefore, there has been hesitatio

n about putting anything about it in print. The presentation which Dr. Sutherland made at the Eastern

Osteopathic Association meeting last spring was such as he has made at various other places. It calls for many draw-
ing, and for the examination of the skull, and the various bones which make it up, most of which do not lend them-
selves well to representation on a flat surface. The illustra-
tions reproduced herewith are not intended to clarify the
text adequately, but they do exemplify the drawings used
freely by Dr. Sutherland in his presentations. It is hoped
that the text will excite interest in many who are not familiar
with the principles underlying this aspect of osteopathic diag-
nosis and treatment, and that to some who already are some-
what familiar with it, it will serve as a review.

It is by no means to be understood that this is the first
appearance in print of material relating to the effects, the
diagnosis, or the treatment of cranial lesions. Dr. Sutherland
brought out a book in 1939, "The Cranial Bowl," which is
no longer in print. In that book there were references not
only to the earlier editorial mention of his work in The

JOURNAL but also to his articles in The Northwest Bulle-
tin and The Western Osteopath.

Dr. Charlotte Weaver has for years lectured and written
on the cranial vertebrae. She had articles on the subject in
The JOURNAL for March, April, May and June, 1936. This
series was followed by a symposium by Drs. Charles L.
Naylor, Earle E. Sanborn, Edward T. White, N. A. Urlich
and Charlotte Weaver, running in The JOURNAL, from
November, 1937, to March, 1938. In The JOURNAL for June
1942, Dr. Perrin T. Wilson had an article in which he re-
ferred to Dr. Sutherland's work and told of his own appli-
cation of a modification of it—Editor.

Our subject is, "The Cranial Bowl," but that is not a detached unit, any more than is any other part of
our complicated body machine. In my interpreta-
tion we take into consideration a mechanism which
includes the brain, the intracranial membranes, the
cerebrospinal fluid, and the articular mobility of the cranial bones; and also the spinal cord, the intraspinal
membranes, again the cerebrospinal fluid, and the articular mobility of the sacrum between the ilia.

The cranial thought belongs to Doctor Andrew
Taylor Still, founder of osteopathy. The Old Doctor
frequently referred to the "osteopathic squirrel," in a
hole in a tree. He had a grip on the squirrel's tail, and
we had to go on and pull it out. The cranial thought is simply a part of the process of getting the
"body of the squirrel" out. The thought provides an avenue for "digging on," through scientific re-
search.

We remember Dr. Still's dictum: "An osteopath
reasons from his knowledge of anatomy. He com-
pares the work of the abnormal body with that of
the normal body." In this avenue of scientific research
one must primarily possess a knowledge of the cranial
structure, within and without. It is as true here
as in any part of the body that, as Dr. Still said
again: "We must know the position and purpose of
each bone, and be thoroughly acquainted with each of
its articulations. We must have a perfect image of
the normal articulations that we wish to adjust."

His anatomical-physiological knowledge was the
keynote of his diagnosis and his corrective adjust-
ments. The cranium is an intricate mechanism, and
requires special study of its complicated articular
surfaces. For the perfection of skill required in
cranial diagnosis and technic, it is necessary,
primarily, to possess a perfect anatomical-physiological
mental picture.

As a preliminary to further study, attention is
called to these illustrations. Observe the L-shape of
the superior articular surface of the greater wing of
the sphenoid bone. The two of these, one for each
greater wing, articulate with L-shaped articular sur-
faces beneath the frontal bone. At birth there are
two frontal bones, and in some adults the sagittal
suture continues down to the ethmoidal notch. In
much as there are two ossification centers, we may
reason on the basis of two frontal bones; the sphenoid
being suspended from the two as the sacrum is
suspended, by the L-shaped articular surfaces, be-
tween, or beneath, the ilia. Both bones, the sphenoid
and the sacrum, have anterior and posterior rotation
articular mobility, as well as sideward movement.

Now observe the little flat process upon the middle
of the anterior superior area of the body of the
sphenoid. This fits into a small groove upon the
middle of the posterior superior area of the ethmoid.
It provides the mechanical arrangement for movement
of the ethmoid when the sphenoid moves downward.
Immediately lateral to this process, on the superior
articular surface of the lesser wings of the sphenoid,
are two lateral beveled articular surfaces, articulating
beneath the two frontal bones, lateral to the ethmoidal
notch. These provide a mechanical arrangement for

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the accommodation of articular mobility between the lesser wings of the sphenoid and the frontal bone.

One need not look farther than these two indications, found upon the articular surfaces of the sphenoid, for a truth signifying that a Master Mechanic designed the bones of the cranium for articular mobility. There are many other indications throughout the cranial bones signifying that truth, which also may be found in the anatomical laboratories of our osteopathic colleges as proof to our anatomists, providing they "dig" for it. The proof of the assertion of cranial articular mobility is right there on the articular surfaces, and it does not require even a mechanical mind to recognize the mechanical principle.

Here at the lower middle anterior area of the sphenoid is a beak-like process, called the rostrum. Doubtless the term was given by some anatomist because of its resemblance to the beak of a bird, which corresponds to the bird-like form of the sphenoid with its greater and lesser wings.

Next we consider the vomer. It has a cup-like articular surface, a provision designed to fit over the beak, or rostrum. It provides a movement like that afforded by a universal joint. From that articulation the vomer extends forward over the roof of the maxillae and palate bones, which also have mobility.

Down here at this inferior area we have rockers, which are known as the internal and external pterygoid processes. They are convex in shape, and hang beneath the bird-like, or boat-like form, from the bottom of the sphenoid. When the sphenoid rocks forward these rockers rotate downward and backward. They articulate with the concave articular surfaces of the little palate bones.

Let us study this concave articular surface on the palate bone in all its details, and articular surface-connecting the maxillae with the palate bones. It almost calls for a magnifying glass to study the orbital surface that sticks up within the orbital cavity.

Dr. Still said: "It is the little things that are the big ones in the science of osteopathy." That tiny orbital surface has a big task to perform in the cranial mechanism. The little palate bone provides an opportunity for osteopathic specialization in the field of eye, ear, nose and throat.

The sphenopalatine ganglion lies between the palate bone and the body of the sphenoid. Articular fixations commonly occur which crowd the palate bone backward onto the ganglion, thus disturbing its functioning. The ganglion sends nerve fibers to the lacrimal gland, the turbinate, the nasal and postnasal areas, and to the mouth of the eustachian tube.

The sphenoid does not articulate with the maxillae, but does with the palate bones. The palate bones fit in between the sphenoid and maxillae, and function as "speed-reducers" to retard the movement between the sphenoid and maxillae. The sphenoid also articulates with another equalizer in connection with the movement of the sphenoid and maxillae. This is the malar, which articulates with the greater wing of the sphenoid within the orbital cavity. As the sphenoid rocks forward, the greater wing swings the malar outward and widens the orbital cavity. As the anterior end of the sphenoid ascends, the greater wing draws the malar inward, and narrows the orbital cavity. The malar also articulates with the maxillary bone. Hence the movement of the sphenoid, through its equalizer the malar bone, moves the maxillary.

The functioning widens and narrows the sphenomaxillary fissure within the orbital cavity. This fact is taken into consideration in the diagnosis of sphenosellar lesions, through observation at a glance. Wide or narrow orbital cavities provide clues, which later may be verified by the skilled art of osteopathic palpation.

The orbital surface of the palate bone is located immediately back of the maxillary, at the beginning of the sphenomaxillary fissure. The infraorbital nerve passes over that tiny orbital surface, just before it enters a groove in the maxillary to find its way to the infraorbital foramen. Were it not for that especially designed little orbital surface, the maxillary bone might saw or wear the infraorbital nerve in two. The orbital surface of the palate bone is an equalizer that removes the tension from the nerve.
At the inferior articular surface, which might be called a lateral articular surface, we find the surface convex. It articulates with a concave articular surface within the condylar area of the occipital bone, in such a way that while the convex surface of the temporal moves in one direction, the concave surface of the condylar area moves in the other.

Just a little farther forward on the condylar portion of the occipital is a small fulcrum, which articulates with a groove beneath the petrous portion of the temporal. This fulcrum is immediately posterior to the jugular foramen. The basilar portion, anterior to the jugular foramen, has a lateral ridge on its articular surface. This ridge articulates within a longitudinal groove on the petrous portion of the temporal. Now it is important to observe the peculiar shape of the temporal bone, that of a disc from which a condition as sometimes occurs in the wheels of automobiles and causes them to wobble.

The temporal bone was especially designed to wobble, in order to accommodate the internal and external rotation of the petrous portions which, in my opinion, takes place with respiratory movements. When the mastoid portion is outward, the mastoid process will be inward; and while the mastoid portion is inward, the mastoid process will be outward. This feature of the wobbling of the temporal bone provides the means of diagnosing, by palpation, a sphenobasilar lesion, the mastoid portion being prominent in one type, and depressed in another.

The cartilaginous portion of the eustachian tube it attached to the petrous portion. It is my belief that the petrous portion rotates externally during the period of inhalation, that the cartilaginous portion rotates externally also, and that the mouth of the eustachian tube opens. Likewise I believe that in exhalation the petrous portion rotates internally, that the cartilaginous portion rotates internally also, and that this causes the mouth of the eustachian tube to close. In case of a lesion fixation in the movement of the petrous portion, the movement of the cartilaginous portion would be in the same fixation and the mouth of the eustachian tube would be either wide open or closed. Here is another opportunity to specialize osteopathically in eye, ear, nose and throat conditions.

The temporal bone, like the sphenoid, does not articulate with the maxillary. It articulates with one of the same equalizers, the malar bone, and the malar bone with the maxillary. This articulation is by way of the zygomatic process of the temporal. The articular surface is semihemispherical and overlaps the malar, providing an up-and-down movement, as the petrous portion rotates internally and externally. One may take a disarticulated temporal bone and demonstrate the wobbling wheel motion, by moving the zygomatic process upward and downward.

The bones at the base of the skull have their origin in cartilage, while the bones of the vault have their origin in membrane. Articular mobility occurs at the basilar area, in the bones having their origin in cartilage. The cranial structure is a cranial bowl, and we could not have articular mobility at the basilar area without compensation by the bones of the vault, that are formed in membrane. Here we have another mechanical design by a Master Mechanic, who understood His handwork.
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cervical vertebrae and the foramen magnum, and without other firm attachment until they reach the sacrum.

Various types of cranial lesions are found in professional practice. Four of these are known as the spheno basal types: the sidebending rotation, the torsion, the flexion and extension lesions. These occur at the junction of the sphenoid with the basilar process of the occipital, and are quite common.

The sidebending rotation lesion is shown in this illustration. The sidebending is convex to the left. The petrous portions of the temporal bones are included in the lesion, the right in internal rotation, the left in external. The basilar process is tipped upward on the right, and downward on the left; while the greater wing of the sphenoid is upward on the right and downward on the left. The anteroposterior diameter of the cranium is shorter on the right, and longer on the left. If one were to observe this type of lesion from the front he would see the right orbital cavity wider while the left would be narrower. The right malar bone would be turned outward, and the left inward. The right eyeball would be forward, while the left would be backward. Such observation would indicate the type of lesion at a glance, and it would be easily verified by palpation.

The torsion type of sphenobasilar lesion is another common one. The sphenoid is twisted in one direction at the sphenobasilar junction, while the basilar process is twisted to the opposite. The basilar process is tipped downward on the right, and upward on the left; and the greater wing of the sphenoid is upward on the right, and the opposite greater wing is downward on the left. The petrous portion of the temporal bone is in external rotation on the right, while the opposite petrous portion is in internal rotation on the left. From the front view the observation indication is the same as in the sidebending rotation lesion, with a wide orbital cavity on the right, and a narrow on the left. The malar bone is turned outward on the right, and the opposite bone inward on the left. The eyeball is forward on the right, while the opposite eyeball is backward. However, the uniform anteroposterior diameter of the cranium differentiates the torsion type of lesion from the sidebending rotation type. The presence and type of lesion may be easily verified by palpation.

The flexion type of sphenobasilar lesion is an exaggeration of the normal flexion position at the sphenobasilar junction. In this type the front view shows both orbital cavities wider, and both eyeballs forward. The malar bones will be turned outward. The greater wings of the sphenoid will be forward, and the petrous portions of both temporal bones will be in external rotation. The lesion may be easily verified by palpation.

The extension type of sphenobasilar lesion is an exaggeration of a normal position at the sphenobasilar junction. From the front view the orbital cavities will be narrow, with backward eyeballs. The malar bones will be turned inward, the greater wings of the sphenoid will be backward, while the petrous portions of the temporal bones will be in internal rotation. The lesion may be easily verified by palpation.

Ossific cranial lesions, come under the head of traumatic types, and in these days of automobile accidents, are frequent. They are described according to the area of traumatic contact:

In the parieto-petrous type the parietal bone has been compressed in between the parietal bones by trauma at the middle area. The inferior angles of the frontal bones will be found inward, thus locking the normal movement of the greater wings of the sphenoid. The lesion may be unilateral, when the trauma occurs either to the right or left of the middle, and in such cases only one inferior angle will be compressed inward at the parietal junction.

In the parieto-mastoid type the parietal bone has been compressed downward by trauma at the junction of the sagittal and coronal sutures. There is a consequent lateral position of the anteroinferior angle of the petrous. There is a subsequent malposition of the condyles of the basilar area of the occipital bone, which have been forced posteriorly within the facets of the atlas bone. The lesion may be either bilateral or unilateral, according to the type of traumatic contact.

In the parieto-occipital type, the parietal bones have been compressed downward by trauma at the junction of the squamous portion of the temporal bones, by trauma occurring at a midway point directly over the sagittal suture. It may be unilateral, when the trauma occurs to the right or left of the squamous internal suture. These squamous portions of the temporal bones are forced forward, with consequent external rotation of the petrous portions at the basilar area, and as subsequent flexion of the sphenobasilar junction.

In the occipitomastoid type the lateral basilar area of the occipital bone has been forced upward between the lateral articular areas of the mastoid portion of the temporal bone, by trauma at the lower region of the occipital bone. The basilar process of the occipital has been forced into its junction with the sphenoid, and the petrous portion of the temporal bone into internal rotation. The lesion may be either bilateral or unilateral, according to the area of contact. These malpositions at the basilar area indicate a rather serious condition in relation to the intracranial membranes that act as channels for the venous flow and which in my opinion incite activity of the cerebrospinal fluid.

In the occipitomastoid type the lateral occipital area of the occipital bone has been forced upward between the lateral articular areas of the mastoid portion of the temporal bone, by trauma at the lower region of the occipital bone. The basilar process of the occipital has been forced into its junction with the sphenoid, and the petrous portion of the temporal bone into internal rotation. The lesion may be either bilateral or unilateral, according to the area of contact. It is another type indicating serious consequence to the intracranial membranes that act as walls to the venous flow and the fluctuation of the cerebrospinal fluid.

The dental traumatic type of lesion opens a field of new possibilities to members of the osteopathic profession. It should interest the dentist as well. Dentists possess special anatomical knowledge and constructive surgical skill in relation to the facial bones, and this type of lesion invites cooperation by the two professions.

It includes a membranous articular strain in relation to the temporal, the sphenoid, and the superior and inferior maxillary bones. The temporal bone on the lesion side is found laterally inward, with its petrous portion in internal rotation; the pterygoid