

today's



chiropractic®

READ BY CHIROPRACTORS AROUND THE WORLD

September/October, 1987

THE MAGAZINE THAT REFLECTS THE LIFE PRINCIPLE IN CHIROPRACTIC

**Why Patients
Change Doctors !**

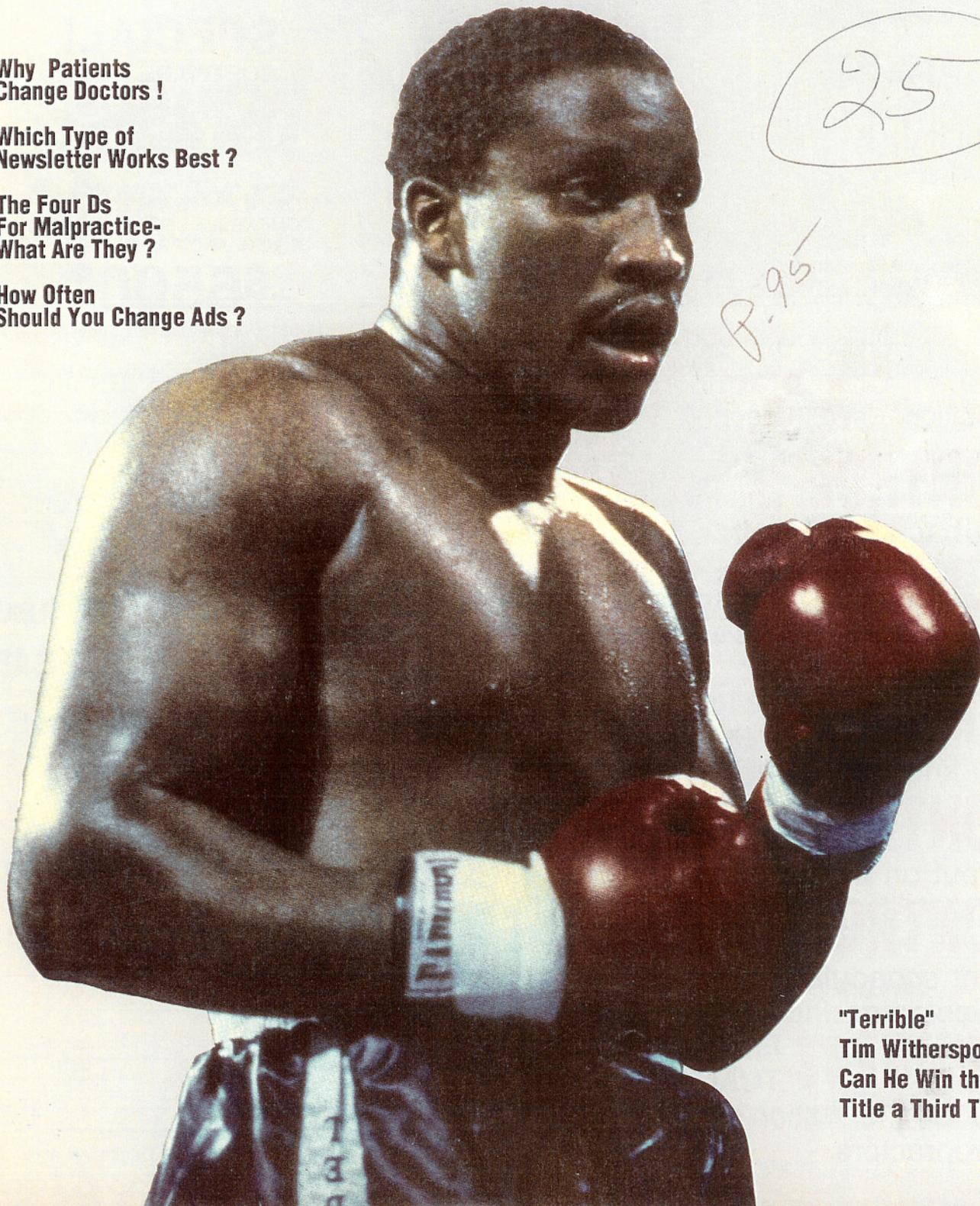
**Which Type of
Newsletter Works Best ?**

**The Four Ds
For Malpractice-
What Are They ?**

**How Often
Should You Change Ads ?**

25

P-95



**"Terrible"
Tim Witherspoon-
Can He Win the
Title a Third Time ?**

The Ponticulus Posticus

By Roy W. Sweat, D.C., and Hal S. Crowe, Sr., D.C.

Part One of Two

What little has been discovered about (the ponticulus posticus) has been largely ignored. It has been described as both acquired and congenital and is accepted by most texts as an ossification of the posterior atlanto-occipital ligament of atlas.

The ponticulus posticus (posticus ponticularis)¹ is a bridge of bone sometimes found on the atlas vertebra surrounding the vertebral artery and the first cervical nerve root (Figure 1). It has been investigated periodically for the last 100 years, yet due to its supposed insignificance, what little has been discovered about this anatomical variant has been largely ignored. It has been described as both acquired and congenital and is accepted by most texts as an ossification of the posterior atlanto-occipital ligament of atlas^{2,3,4,9,11}.

This variant has been renamed more than once: *Foramen Atlantoideum*, by Bolk in 1906; *Foramen Sagittale*, by Loth and Niemirycz in 1916; *Foramen Atlantoideum Vertebrale*, by Deseze and Djian in 1953⁶; *Foramen Retroarticulare Superior*, by Brocher in

1955; *Canalis Arteriae Vertebralis*, by Wolf and Heidegger in 1961; *Kimmerle's Variant* and the *Foramen Arculae*, by von Torklus and Gehle in 1972⁷; and the *Retroarticular Vertebral Artery Ring of Atlas*, by Lamberty and Zivanovic⁵ in 1973.

History of Research

Gray's Anatomy and other anatomy and spinal texts describe this bony arch as an ossification of the inferior or "free" end of the posterior atlanto-occipital membrane, sometimes called the oblique ligament of atlas as the membrane acquires a more fibrous texture where it crosses over the vertebral plexus⁵, vertebral artery and first cervical spinal nerve lying in the retrocondylar groove of atlas^{3,5,9}. Most studies done on the

posticulus posticus since 1881 have been described as morphological in approach and were set up to determine rate of occurrence and associated symptomatology.

Recorded occurrence has ranged from 7.4 percent by Loth-Niemirycz in 1916⁵ to 37 percent by Dubreuil-Chanbardel in 1921¹⁰. Most studies find the occurrence to fall usually between 17 percent and 21 percent when incomplete rings are taken into consideration (Figure 2).

Radojevic and Negovanovic in

1963 compared cervical x-rays of patients and indicated that most x-rays visualizing ponticulus posticus were of patients with suspected epilepsy, cerebral tumor, headache, and occipital neuralgia. Ercegovac and Davidovic in 1970 alleviated symptoms of vertebro-basilar insufficiency in eight cases by surgically removing these bony rings of atlas. Clinical diagnoses of these eight patients included stress, psychogenic, depression, and muscular neck pain⁵. Lamberty and Zivanovic state that "the



Fig. 6: The complete unilateral x-ray view of the ponticulus posticus.

symptoms of vertebro-basilar insufficiency may be caused by the bony rings around the vertebral artery in the absence of identifiable arterial disease and that it may be a predisposing factor when arterial disease is present".⁵

Upon our investigation of the ponticulus posticus, it was soon realized that all studies done previously were not consistent with each other and often conflicted. Major questions were left unanswered:

(1) As it appears that the ponticulus most often accompanies a

straight or military cervical curve, is there a relationship?

(2) Is the bony arch an acquired calcification of the posterior atlanto-occipital membrane?

(3) Is the posterior atlanto-occipital membrane a ligament or a membrane?

(4) Do other osteophytic variations occur in association with the ponticulus?

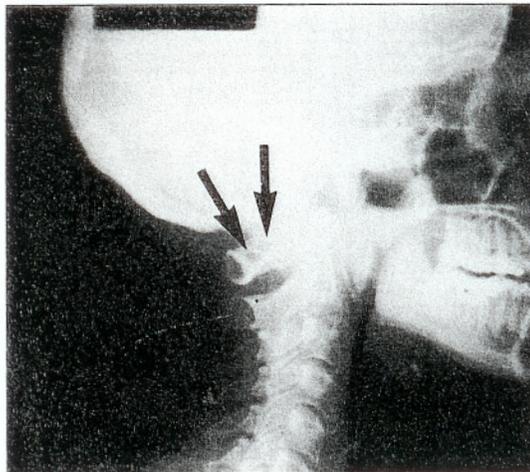
(5) What is the clinical significance, especially in relation to cervical manipulation or forceful adjustments?

(6) With all previous concentrations on the effects of the ponticulus on the vertebral arteries, what is the importance of the C-1 nerve sharing this foramen?

Method and Materials

Our approach to the study of ponticulus posticus was an attempt to use all available means of assimilating as much information as possible, as objectively as possible. Video-fluoroscopic tape record-

Fig. 7:
The complete bilateral x-ray view of the ponticulus posticus.



Photos: Gary Bass and Keith Crowe

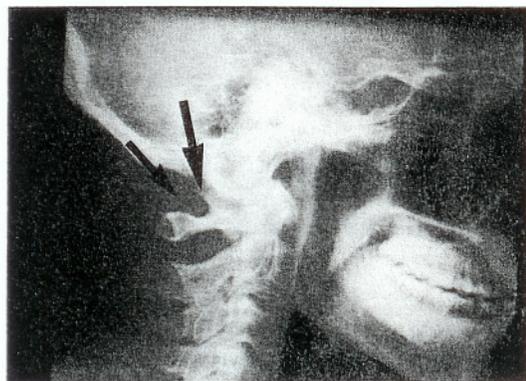


Fig. 8:
A view of the incomplete ring.

ings of cervical range of motion studies with patients demonstrating a ponticulus posticus were viewed. Cervical and central nervous system dissection, under the direction of Dr. Macon Weaver of Life Chiropractic College, focused not only on the atlas vertebra, but the

posterior atlanto-occipital membrane, the vertebral arteries, the first cervical spinal nerve, the meningeal attachments, and the upper cervical spinal cord.

Five dry specimens were located from various private collections, two complete with axis and skull. Numerous x-rays and photographs were made of the dry specimens, including specific chiropractic views for comparison with patient x-rays. One dry specimen ponticulus was dissected for observation of the bony matrix. The dry cervical spine of a raccoon was prepared and photographed for comparison to the human specimens (Figure 3).

One thousand lateral cervical x-ray films were selected in alphabetical order from an upper cervical chiropractic practice. All films were taken between 1952 and 1984 and were pro-

TABLE 1
OCCURRENCE OF PONTICULUS POSTICAE AS VISUALIZED RADIOGRAPHICALLY

BILATERAL	
Complete, Both Rings	65 or 34.5%
Incomplete, Both Rings	22 or 11.6%
One Complete, One Incomplete	18 or 09.5%
UNILATERAL	
Complete Ring	47 or 24.8%
Incomplete Ring	37 or 19.6%

TABLE 2
INCIDENCE OF 232 ENTRANCE COMPLAINTS/
189 PATIENTS EXHIBITING PONTICULUS POSTICUS

Back Pain (Dorsal, Lumbar, Sacral)	84 or 36.2%
Headache, Vertigo, Diplopia	60 or 25.9%
Neck, Brachial Symptoms	55 or 23.7%
Hip, Leg Pain	19 or 08.2%
Tension, Hyperactivity, Insomnia,	
High Blood Pressure	10 or 04.3%
Respiratory Illness	04 or 01.7%

vided from the case files of Dr. Hugh L. Crowe. Radiographs exhibiting two-thirds or more of a foramen created by the bony bridge were pulled for further study. Those not forming at least two-thirds of a foramen between the posterior lateral mass and the posterior arch were not used. Of the 1,000 lateral views, 189 patients exhibited either a complete or incomplete, unilateral or bilateral, ponticulus posticus. Following the lateral

view, nasium and vertex views of the 189 cases were studied. Ponticulae are difficult to observe in these views.

The case histories of the 189 patients in the study were reviewed, making note of their entry complaints and their symptomatic response to specific upper cervical chiropractic adjustments. Note was also made from the pre- and post-adjustment pictures of the amount of reduction in the misalignment factors of the atlas subluxation complex.

Anatomical Study Results

Our method of study indicates 18.9 percent of patients demonstrates on x-ray an arch of bone forming at least two-thirds of a foramen bridging the lateral mass to the posterior arch on at least one side of the first cervical vertebra (Figure 4). The highest percentage was bilateral, complete ponticulus posticae, forming distinct foramina posterior to both lateral masses (See Figure 5). In Figures 6-8, unilateral and bilateral x-ray views of the ponticulus posticus are shown, as well as the incomplete ring.

Most textbooks state outright that the ponticulus forms in late life and is not seen in children^{1,6,9,11}. Of our 189 subjects ranging from 5 to 77 years of age and averaging 36.6 years, 15 subjects were 15 years of age or younger, 10 were children under 12

years old, including a 5-year-old and two 6-year-olds. Three children, ages 9, 12, and 14, displayed bilateral complete ponticulae.

Editor's Note: Part 2 of this article was published in the July-August issue of Today's Chiropractic. including Figures 1-5 of this.....

About the authors: Roy W. Sweat, D.C., is a noted author, lecturer, and researcher who maintains a private practice in Atlanta, Georgia. Hal S. Crowe, Sr., D.C., is a graduate of Life Chiropractic College and has been affiliated with the Atlas Orthogonal Program since 1982; he maintains an upper cervical practice in Brunswick, Georgia. For more information about this study, write to Dr. Sweat, 3274 Buckeye Road, N.E., Atlanta, Georgia 30341.

References

1. Burns, R.E., *Field Guide to the Upper Neck*, p. 42.
2. Erhardt, R., *Seminar Lectures and Chiropractic References of Clinical Radiographic Studies*, 1978.
3. Hamilton, W.J., *Textbook of Human Anatomy*, 2nd ed., p. 45, 49-52, Mosby Co., 1976.
4. Jackson, R., *The Cervical Syndrome*, p. 78, 79.
5. Lamberty, B.G.H., and Zivanovic, S., "The Retroarticular Vertebral Artery Ring of the Atlas and Its Significance", *Acta Anatomica* 85:113-122, 1973.
6. Sexe, S., and De Et Djian, A., "L' Anneau Atlodien De La Vertebrae, La Deniscence Transversaire De L' Atlas", *Rev. Rhumat. Malad Osteo-Art*, p. 160-166, 1953.
7. Von Torklus, D., and Gehle, W., *The Upper Cervical Spine*, p. 27-28, Grune and Stratton, 1972.
8. Wake, E.H., *Hyman's Comparative Vertebrate Anatomy*, 3rd ed., p. 53, 163-168, 228, University of Chicago Press, 1978.
9. Warwick and Williams, *Gray's Anatomy*, 35th ed., p. 235, 278, 416. W.B. Saunders Co., 1973.
10. Warwick and Williams, *Gray's Anatomy*, 36th ed., p. 273, 448-449. W.B. Saunders Co., 1980.
11. White and Panjabi, *Clinical Biomechanics of the Spine*, p. 67, 205. Lippincott, 1978.
12. Case Studies, Sweat Chiropractic Clinic.
13. The Cinefluoroscopy Studies, Sweat Chiropractic Clinic.