

# The Carotid Siphon: An Angiographic Sign of Historical Import That is Now Antiquated

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### Introduction

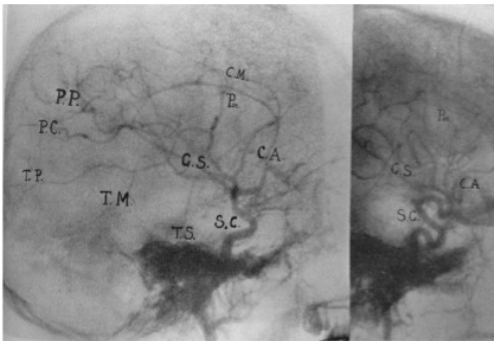
The term carotid siphon was introduced by Egas Moniz in 1927 to describe the radiographic appearance of the intracranial internal carotid artery (ICA). The written term first appeared in the Lancet, 1933, in his description of the ICA as "an anterior bend which traverses the cavernous sinus and another which lifts the artery. The whole is really more complicated. After the second bend, the artery curves forward and immediately backwards again. We call this complex the carotid siphon." While the term gained popularity during the following decades in both the anatomical and medical literature, conflicting definitions have been proposed and continue to persist.

### Methods/ Results

A review of Moniz's original monographs and images was completed. Figure 1 is a photocopy of his reference for his initial written description. Figure 2 is the numeric description of the ICA used to analyze his statements and images. As seen in figure 3, two arguments can be made fitting Moniz's original description depending if one assumes Moniz intended the whole statement to describe the carotid siphon (3B), or if the last sentence refers to the siphon and the first to the ICA(3A). Regardless, both are flawed, as 3A would consider the petrous carotid to be intracavernous, and 3B would include part of the A1 and M1 into the siphon. Figure 4 shows variation in the placement of the S.C. (siphon carotiden) in his other images.

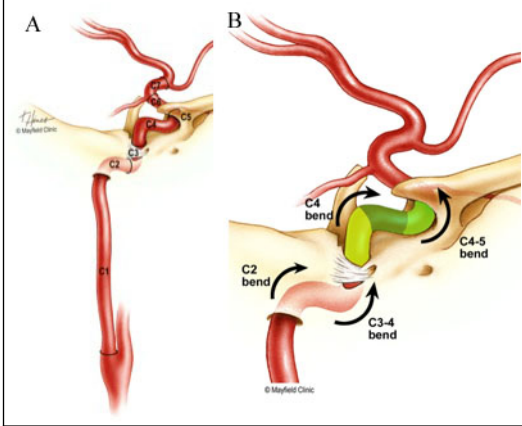
A search of the term carotid siphon identified more than 400 articles from the anatomical and medical literature during the past six decades and included authors such as Yasargil, Osborn, Traveras, Wood, and Lazorthies. Three general interpretations predominate: intracavernous, cavernous and intradural not including the terminus, and cavernous and intradural ICA including the terminus.

Figure 1



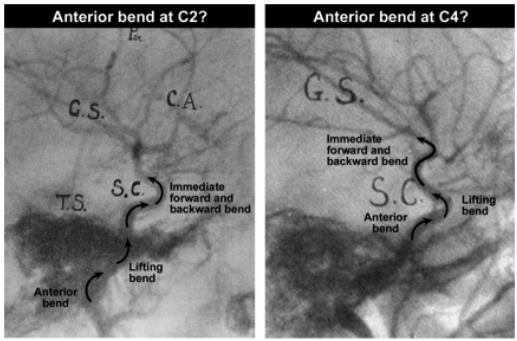
Cerebral angiograms from Moniz's 1933 Lancet article depicting the bends of the internal carotid artery and introduction of the term single siphon (S.C.) (left) and double siphon (right).

Figure 2



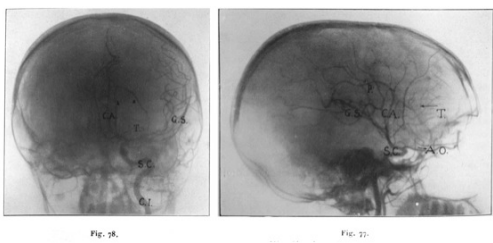
Classification numbering systems of the internal carotid artery. (Left) Seven-segment anterograde classification system proposed by Bouthillier et al. 16 (Right) Modified classification includes the arterial bends proposed by Depowell et al. 17

Figure 3



**Figure 3A(left)/B(right):** Moniz describes a sequence of bends and curves in the ICA anatomy and carotid siphon in lateral radiographs. Given the variability between the radiographs and the chronological order in which he describes the bends, two arguments can be made to fit known ICA anatomy. A) From 1933 Lancet article describing the carotid siphon, the anterior bend represents the C2 bend, the lifting bend is the C4 bend, and the immediate forward and backward curve represents the C4-5 bend. B) From 1934 monograph, the anterior bend represents the C4 bend, the lifting bend is the C4-5 bend, and the immediate forward and backward curve is the intradural ICA and bifurcation.

Figure 4



**Figure 4:** AP (left) and lateral (right) radiographs from a Moniz monograph<sup>11</sup> showing inconsistent labeling of the carotid siphon (S.C). AP shows the S.C. near the C2 bend whereas the lateral radiograph is labeled between the C4 and C4-5 bends, which is consistent with most of Moniz's images.

### Conclusions

In examining Moniz's original work on the carotid siphon, we followed the authors who attempted to correlate his original description of this two-dimensional radiographic projection with anatomical documentation. Tracing the etymology of this word's origin and usage during six decades in the medical literature documents continued discrepancy rather than consensus. We propose that this term is historically relevant but should be supplanted by a definitive ICA classification system, which continues to evolve in contemporary medical and anatomical communications.

### References

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