

## THE LONGITUDINAL SINUS AS THE PLACE OF PREFERENCE IN INFANCY FOR INTRAVENOUS ASPIRATIONS AND INJECTIONS, INCLUDING TRANSFUSION \*

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The more frequently it has become necessary to obtain sufficient blood from infants for various diagnostic purposes in recent years, the more evident is the fact that the various methods of obtaining it are unsatisfactory. The method of scarification gives tissue juice in addition to blood and is not applicable for bacteriologic work on account of the frequent contaminations. The method of obtaining blood from the veins of the scalp, from the jugular or other veins, is very difficult and open to frequent failures. This is especially true in some toxic conditions in which even the external jugular is not to be seen or palpated.

From the anatomic point of view there is one place that is far superior to any other for the purpose of obtaining blood, namely, the longitudinal sinus in the area of the anterior fontanel. Inasmuch as the sinus grows gradually larger toward the back of the head, it is advisable to attempt the puncture as far posteriorly as possible. The course of the sinus does not vary and it is readily located from the external landmarks. The vein, furthermore, is rigid, cannot be pushed aside, and on entering the sinus one gets just as definite a sensation of being within the lumen of the vessel as one does in piercing the dura in making a lumbar puncture. When one takes into consideration the fact that punctures of the ventricles can be done without any harm, the damage that might result from an occasional puncture of the brain substance is negligible. This method offers a sure, easy way of obtaining blood from an infant under any and all circumstances.

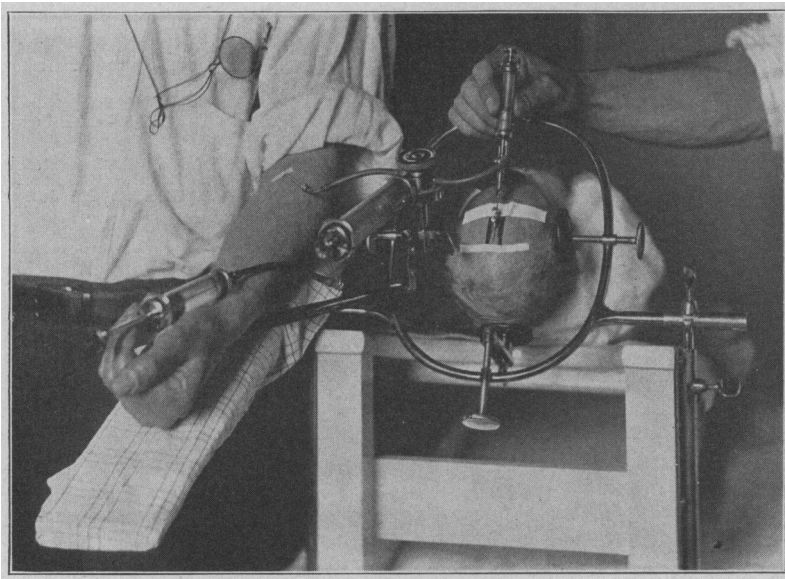
This does not exhaust the advantages of the sinus route. Just as readily as it lends itself to the obtaining of blood, can it be used for intravenous injection. Tobler<sup>1</sup> in a recent communication has pointed out the advantages of this method, which was first used by Marfan in 1898, for intravenous administration of salt solution. Tobler describes in detail the anatomy of the part and the technic of carrying out the puncture.

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\*From the Otho S. A. Sprague Memorial Institute Laboratory of the Children's Memorial Hospital.

1. Tobler, L.: Zur Technik der diagnostischen Blutentnahme und der intravenösen Injection beim Säugling, *Monatschr. f. Kinderh.*, 1915, xiii, 384.

My interest in the sinus puncture arose principally from the fact that it offered a solution of the difficulties of transfusion during infancy. Vein to vein anastomosis, by suture or tube, is a surgical procedure that requires an expert and special apparatus. The failure of the syringe method of transfusion is dependent, even in the hands of an expert, on the difficulty of getting into the infant's vein either directly or after cutting down on the vein. This is especially true of cases of melena of the new born in which the external jugular may be completely collapsed when dissected out. By using the sinus route this difficulty is completely obviated and the method becomes just as easy if not easier than a vein to vein syringe transfusion of the adult.



The figure illustrates the apparatus as it has been worked out for transfusion. Tobler's communication, coming at a time when only a few transfusions had been done, helped a great deal to give the author confidence in the method.

The question of negative pressure within the sinus is one that cannot be overlooked, and it is well always in entering the sinus to have a syringe attached, and always before injecting anything to withdraw blood, to make sure that the needle is in the sinus. To simplify this procedure without changing any connections, the needle that is to enter the sinus is attached to a two-way stopcock, which at one outlet is connected with a record syringe, and at the other with the transfusion apparatus. When the needle is inserted the stopcock is turned so as to connect with the record syringe, into which, as soon as the needle enters the sinus, blood is drawn. This blood can then be used for

bacteriologic examination or returned into the sinus. The valve is then turned and the blood is expelled from the needle with the saline solution which fills the transfusion apparatus. The apparatus used in transfusion is the one described by Unger.<sup>2</sup> The advantage of this method is that there is a constant flow in both directions when blood is drawn into the syringe from the donor, saline is going into the vein of the recipient, and when the blood is being delivered to the vein of the recipient, saline is going into the vein of the donor.

In order to steady the needle in the sinus I have used the little holder shown in the figure, which is fastened to the head with adhesive in such a way that the needle when pushed through the metallic guide will enter the most posterior portion of the anterior fontanel in the midline. The guide has several screw clamps so that when the needle has entered the sinus these can be tightened. The guide is set at an angle of 25 degrees with the scalp.

In the figure is shown the head holder that has been used in holding the infant's head in position. This is not absolutely necessary, but makes the transfusion much easier. For long continued injections of saline solution it is especially useful.

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2. Unger, L. J.: A New Method of Syringe Transfusion, *Jour. Am. Med. Assn.*, 1915, lxiv, 582.