

## THE CONTROL OF HEMORRHAGE BY MEANS OF FORCEPS-TOURNIQUET IN MAJOR AMPUTATIONS.

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It was in an article published in *The Lancet*, 23d of April, 1898, that I first suggested the method of controlling hemorrhage at the hip-joint by means of a pair of forceps similar in general form to those of Doyen's stomach-clamp. Since that time I have performed all my major amputations after the same fashion, and have neither used the Esmarch's, nor any other form of tourniquet, nor have I availed myself of the services of a trained assistant to control hemorrhage in cases where great authorities like Lister, Macewen, Syme, and others have recommended them.

The pattern of forceps-tourniquet which I now use and find most convenient is illustrated in Fig. 1.

The blades of the forceps are  $6\frac{1}{2}$  inches long. For the purpose of description, I call the blade which is passed into the tissues, the *internal* blade; this is passed behind the blood-vessels and has a blunt point and is smooth and rounded in order to facilitate its passage through the tissues; at the same time to guard against the possibility of doing damage to blood-vessels or nerves against which it may impinge during its forcible passage.

I have found the ordinary Doyen clamp to be positively dangerous for the purpose, on account of the point and the edge of a blade being often as keen as that of a knife edge. The *external* blade (*i.e.*, the one in contact with skin) is rough and serrated in order to prevent it slipping over the surface of the skin. The *shoulder* is made on this blade in order to avoid compression of the skin and underlying tissues when

the forceps is clamped on a muscular or fat limb, and also to prevent interference with the compression force of the far end of the forceps.

The principle of the method is that of simultaneous parallel compression of the blood-vessels (artery and vein) between the blades of the forceps; one blade (internal) being placed behind the blood-vessels to be controlled, and the other blade (external) being in contact with the skin.

In Fig. 2 is represented a transverse section through the hip-joint at a point where the internal blade of the forceps has been passed behind the blood-vessels and its external blade in contact with the skin.

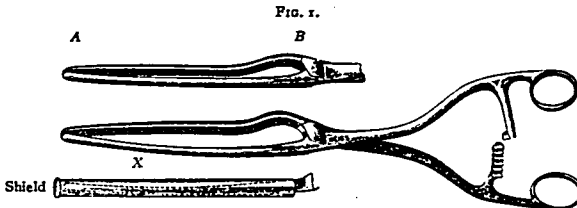


FIG. 1.  
A-B, 6½ inches (six and a half inches). X, smallest diameter of internal blade 14b measured by Cicero Smith's micrometer. Shield for carrying antiseptic jelly for the internal blade during military operations.

I will describe the method as originally employed at the hip-joint. A small stab puncture was made immediately below the anterior superior spine of the ilium, and through this the *internal* probe-pointed blade was pushed forcibly towards the neck of the femur, parallel with Poupart's ligament, and driven home as far as it would go. The limb was then elevated vertically for a couple of minutes in order to exsanguinate it, then the forceps was clamped; this action effectually and simultaneously compressed the common femoral artery and vein. After the anterior flap was made and turned up, the gaping blood-vessels were clamped by hæmostatic forceps and afterwards the forceps-tourniquet was released and withdrawn and was then passed behind the neck of the femur in order to control the blood-vessels in the posterior flap.

By this method the loss of blood during amputations of

the hip-joint has become practically negligible, and in quantity is not more than is always lost during amputation by any of the other so-called bloodless methods.

In 1904 I recorded a series of amputations which I had at that time performed successfully by this method of control of the main blood-vessels, and they included *three* at the hip, *five* interscapulothoracic, *seven* through the thigh, and others.

I then claimed that the mortality in amputations following this method of controlling hemorrhage was not more than that after any other method ever suggested. Since that time I have performed similar operations successfully, and in one case I have successfully removed the ilium in addition to the removal of the whole lower extremity.

The ages of my patients have ranged from infants to that of an old lady of eighty-four.

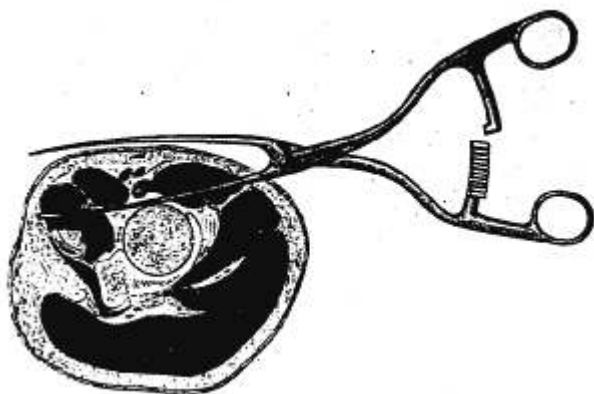
The method is simple, effective, reliable, and requires no assistant; the forceps-tourniquet is easily sterilized with the ordinary instruments, and during the operation it is entirely under the sole control of the operator.

It is not my intention to discuss the value of other methods of controlling hemorrhage, which are so well known to your readers, but I would invite my American confrères to give this method a trial, as I feel that it can be adopted without anxiety in the scrupulous requirements of modern aseptic or antiseptic surgery.

I believe that Dr. Charles Mayo was the first to use this method of controlling hemorrhage in the United States.

Note.—Since the above was written I am glad to find that Dr. Binnie in the second volume of his "Operative Surgery" refers to the method. Professor Kocher in Europe and Jacobson in England, and Thompson and Wiley in Scotland have already included in their well-known works my method amongst the recognized ones.

FIG. 7.



Section of thigh through hip-joint showing method of controlling femoral vessels by forceps-tourniquet.

FIG. 8.



Forceps-tourniquet applied to left femoral vessels.