

## SURGERY

IN CHARGE OF

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## HOW TO AMPUTATE.

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In every amputation the preservation of the life of the patient is the first great principle to bear in mind; the second is to preserve the greatest amount of usefulness for that part of the member which is left with the body. Since hæmorrhage is the chief fact of shock, to prevent loss of blood is essential. Practically, every amputation should be governed by these laws.

When hæmorrhage has not occurred before the case is in the hands of the surgeon, this element of danger may, thanks to modern surgery, be eliminated. There is not an amputation, from the fingers to the shoulder-joint, or from the toes to the hip-joint, in which hæmorrhage cannot be eliminated as a factor of danger to the patient's life. And even when extensive bleeding has occurred before amputation is undertaken, the introduction of hot salt solution into an exposed vein, or in a vein at the bend of an elbow, does much to eliminate the great danger of shock from hæmorrhage. Therefore, beyond the saving of blood and of as much of the limb as is possible, I have never practiced any fixed rules as to *how* to amputate. Even in the formation of flaps we should make the flap always with the view of saving as much as possible of the limb. With a single exception, I have considered the tarsus and meta-tarsus as a single bone, paying no attention to joints, taking only the precaution to remove any thin film of bone or cartilage which might still remain when the saw passes the articulations. The only exceptions to this rule are (1) in the matter of an amputation at or near the ankle-joint. From experience I am convinced a better degree of usefulness can be obtained by a properly adjusted artificial foot to the stump of a Symes' amputation, than to one which saves either a portion of the os calcis (Pirogoff), or when part or all of the astragalus is left in (Hancock). From the ankle to the hip, the same conservative idea should prevail, unless (2) the line of the saw passes within one inch of the knee-joint, or (3) above the

trochanters. In these conditions, it is conservatism to remove the upper end of the tibia and amputate at the knee-joint to enucleate the head of the femur. In amputations of the hand, the preservation of as much tactile sense, together with as much of the member as possible, should be the rule. This should hold, especially in the case of those who use the hand in any avocation. In certain cases of those who do not labor, amputations which sacrifice even more of the member are justifiable. For example, a more shapely hand is often left by the removal of a portion of the metacarpal bone with the finger.

In the effort to prevent loss of blood in an amputation, it may not be always essential to success to force out all the blood that is in the member to be sacrificed. When the quantity of blood is normal, or nearly so, and there has been no hæmorrhage and the patient is in good condition, the sudden crowding of the blood that may be in the limb, such as the lower extremity, into the remaining vessels, may put a strain upon the heart that will produce a serious result.

Of the seven hip-joint operations that I have performed by my own method, the only case I lost was that of a young man, about nineteen years of age, with a sarcoma of the knee. Estimating all the blood that ran out of the wound from the leg, he did not lose in all more than five ounces. The pulse was full and bounding after he was put to bed, and it seemed to me that it was one of the most favorable cases I had had. I left the patient in the hands of an assistant and went to the country; the man went into shock about three hours after the operation and died without ever having reacted. His kidneys were normal; the anæsthetic given was ether, with an Ormsby inhaler, and the quantity was very small. He died, in my opinion, from heart fatigue. The strain on the heart muscle, especially the right side, was too great, and it quit work.

In emptying the member of blood, elevation of the extremity will cause the greater part to gravitate into the vessels of the trunk. In anæmic cases, application of the Esmarch bandage from the periphery almost to the location of the disease,