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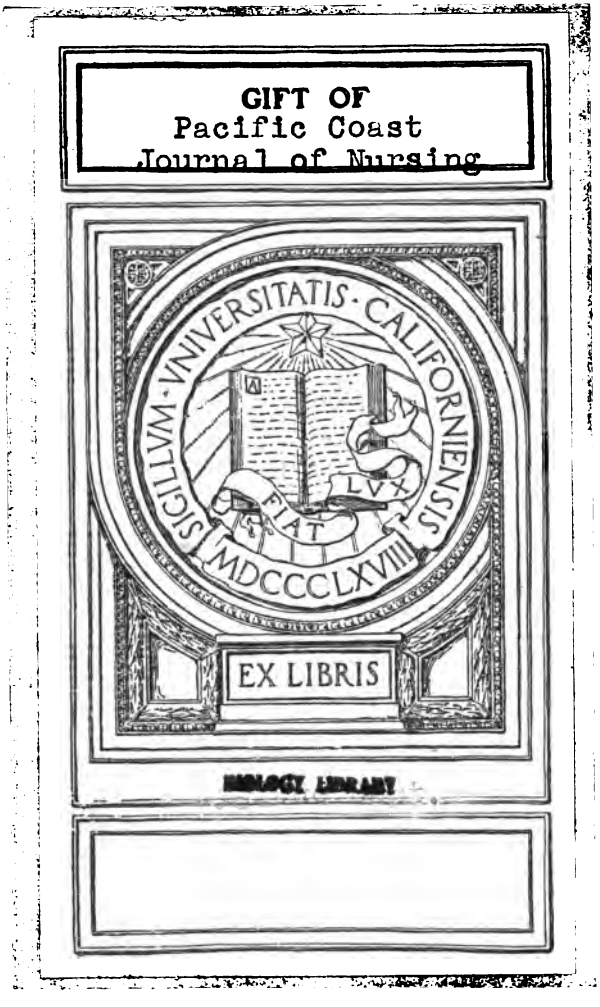

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Practical Bandaging.

GENEVIEVE COOKE, Editor.

PRACTICAL BANDAGING

INCLUDING

ADHESIVE AND PLASTER-OF-PARIS DRESSINGS

BY

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To

PROF. EDWARD MARTIN, A.M., M.D.

TO WHOSE EXAMPLE, AID AND
PRECEPT THE AUTHOR OWES MUCH

PREFACE

THIS work has been written for students and nurses, and for that reason has been made as simple and non-technical as possible. An endeavor has been made to clear up a number of points in the application of bandages, that have been more or less indefinitely presented heretofore. All the recognized classical bandages in common use are described. In addition, however, the author has added paragraphs or illustrations of methods or turns which have been found more efficient in his experience. An effort has been made to have the illustrations absolutely correct and for this reason all the drawings were made from a model dressing.

Some of the illustrations are retained as photographs, thus hoping to make the impression more realistic and lasting.

Due to the increasing usage of gauze bandage the pliability of which covers a multitude of sins, there is a tendency to neglect the fundamental principles of bandaging. One should remember that every bandage properly applied takes less material, retains its place better and gives a much better impression, than one improperly applied.

One chapter is given up to the miscellaneous bandages and dressings and includes handkerchief bandages, cravats, slings, swathes and various especially constructed dressings in more or less common use.

A short chapter handles in a brief manner rubber or elastic bandages and their substitutes.

Chapter IV treats in detail the question of adhesive plasters, describing the various types, their storage, application and removal. Illustrations show the various dressings employed.

The last chapter discusses plaster of Paris in all its phases. The reader is shown every step from the making of the individual plaster bandage to the application of the completed dressing in its many forms and finally its removal.

This work is meant merely to describe the various dressings and their application. No attempt has been made to consider the indications for such dressings.

THE AUTHOR.

PHILADELPHIA, JULY, 1914.

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PRACTICAL BANDAGING

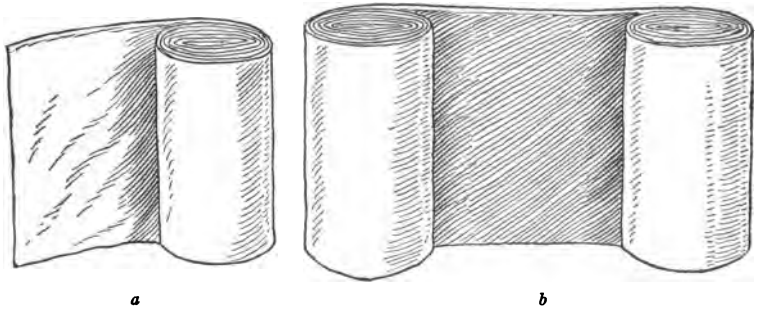
INCLUDING

ADHESIVE AND PLASTER-OF-PARIS DRESSINGS

PART I

ROLLER BANDAGES

Fundamental Facts.—A *roller bandage* is a strip of material of any width or length rolled upon itself to form a compact body. It may be rolled from one end, single roller (Fig. 1, *a*), or both ends, *double roller* (Fig. 1, *b*). When the word *bandage* is spoken of unqualified, a single roller is



a *b*

FIG. 1.—Roller bandage. *a*, single; *b*, double.

meant. The roller has an upper and lower edge, an inner and outer surface, a body, an initial or free end, and a terminal or hidden end.

The *purposes* of a bandage are to retain dressing, to render support, and to make compression.

The *material* composing the bandage depends on the purpose of the bandage. Bandages for retaining dressings are of

gauze or muslin. *Gauze* is oftenest used as it is soft and pliable and lends itself easily to the shape of the part covered. *Flannel* and sheet wadding are used for protective dressings, as, for example, beneath plaster of Paris. *Crinoline or tarlatan* is used in the production of the common plaster-of-Paris bandages for fixation dressing or "cast" of a permanent nature, as for fractures and dislocations. *Elastic* bandages

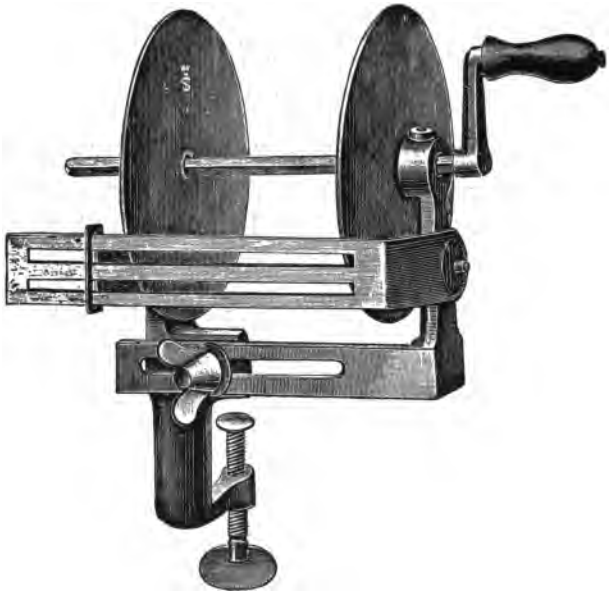


FIG. 2.—Bandage roller.

are employed for compression either as a tourniquet or for general uniform pressure, as in treatment of leg ulcers, varicose veins of leg, joint affections, shock and hemorrhage.

Preparation of Bandages.—Commercial bandages of any description may be obtained from almost any drug store or surgical supply house. They may be bought, if so desired, put up in sterile packages. Should it be desired to make one's own bandages a length of the desired material is procured

and the selvage removed. The width is now divided at the extremity into the desired bandage width and each strip torn down about a foot. The alternate strips are then pulled separate ways tearing the entire length of the piece of material. Cutting the strips gives a neater bandage. The material, folded into several layers, the top layer marked off into bandage widths with a pencil, is cut along the lines, with heavy scissors.

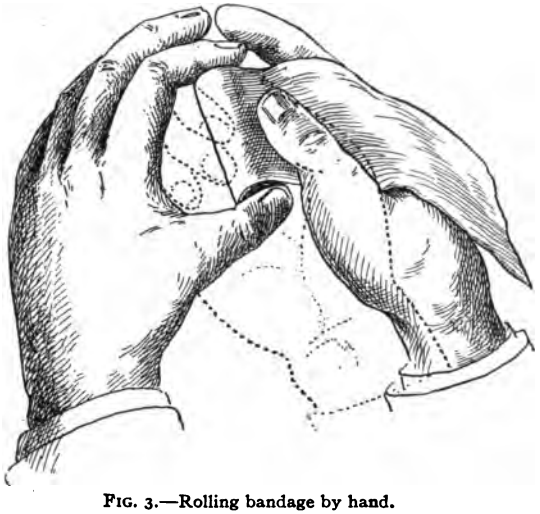


FIG. 3.—Rolling bandage by hand.

How to Roll Bandages.—Bandages are rolled on a machine, the bandage roller, or by hand.

By Machine.—By the use of the bandage roller (Fig. 2) the bandage can be rolled in a very short time. It is a small winch, which is fastened to the table. The bandage is fed through the guide bars, moistened on its end and wound around the smaller end of the winch rod. It is then slid over to the increasing diameter of the rod until it sticks fast. When the entire bandage is rolled, the roll is grasped tightly with the left hand and the winch turned two or three times,

thus tightening the roll. Back the winch rod three or four turns and withdraw from the roll.

By Hand (Fig. 3).—Eighteen inches at one end of the bandage is folded repeatedly on itself until the reduplicated portion is three or four inches long. This is now tightly rolled by a finger and thumb until the roll is large enough and firm enough to withstand a fair amount of pressure in the direction of its long axis, without bending, between thumb and forefinger. Grasp the roll between the thumb and index finger of the left hand, the body of the roll being beneath and the free end passing over the index finger, between it and the

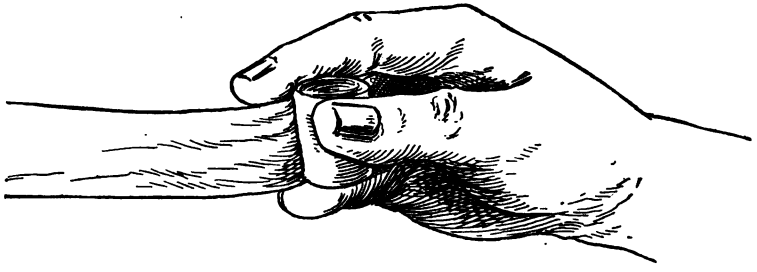


FIG. 4.—Method of holding a bandage.

thumb, of the right hand. Holding the roll firmly with the left hand, allowing free portion of bandage to slip through the right hand, supinate both hands, then, grasping roll between the thumb eminence and fourth and fifth fingers of the right hand, release pressure of the left finger and thumb pronating both hands. Repetition of these movements rolls the bandage. Rolling a bandage may also be accomplished on one's thigh or on a flat surface, placing the rolled portion of the bandage on the flat surface between it and the flexor surface of the tips of the fingers. By gentle pressure the fingers are pushed forward in the direction of the free end of the strip lying extended beyond, thus rolling the bandage on itself. The bandage when rolled should be tight, with even edges, and free from ravellings.

Starting Bandages.—Grasp roller with body uppermost (Fig. 4), in right hand, with three or four inches of free end. Apply this initial extremity smoothly on the part and, holding the end firmly against the part, allow roller to run to the right around the part to the back when it is transferred to the left hand, the right hand now fixing the initial extremity. The left hand brings the roller front where it again is taken by right hand and the second turn begun, exactly overlaying the first in order to " fix " the initial extremity. These turns

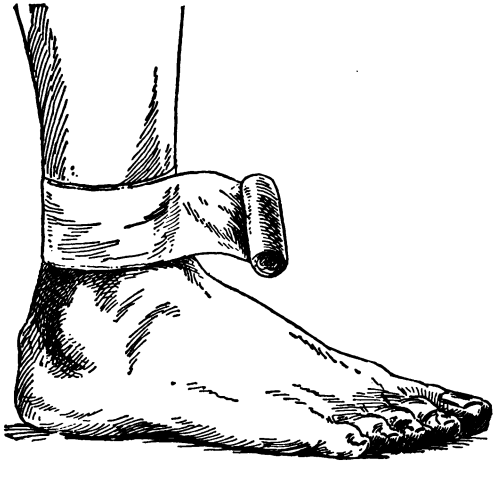


FIG. 5.—Circular turns of a bandage.

FIG. 6.—Oblique fixation of a bandage.

are called simple or circular turns and should be placed at the point of the least diameter of the part bandaged (Fig. 5), (*i.e.*, at ankle or wrist, rather than at mid-calf or mid-forearm). The initial extremity may be fixed by the oblique method also, as shown in (Fig. 6).

Requisites of a Bandage.—The desired result should be accomplished with the least turns possible. All similar turns should, as far as possible, have the same distance between them, and their edges as near parallel as possible. Each turn must be evenly and firmly applied, showing no wrinkles or

ravellings or gaps between turns. The surface of the bandage must lie flat on the part bandaged. If applied too loosely the bandage displaces easily. If applied too tightly it is uncomfortable and may obstruct the blood supply causing swellings, discoloration, numbness and tingling, pallor, coldness or subsequent gangrene if tight enough to shut off blood supply. In applying turns near a joint care should be taken to have the joint in the position in which it is to remain after the dressing is completed. Special care must be taken with regard to bony prominences that they are well protected from pressure by the interposition of cotton. Skin surfaces ought never to be bandaged in direct contact. Always interpose gauze or lint whenever possible. Leave some portion of the part distal to the bandage exposed whenever possible, in order that the circulation may be watched. In applying a simple circular bandage around a cylindrical part, place the initial extremity at right angles to the axis of the part. In case one bandage is too short for the dressing, confine the distal extremity by one or two fixation turns of a second bandage, and then proceed as before.

Ending a Bandage.—After the application is completed, the distal extremity may be secured by a pin, adhesive strips, sewing, or splitting the end of the bandage for a distance of more than half the diameter of the part and passing the ends around in opposite directions and tying. Should none of these methods be feasible, simply tuck the end of the bandage under the last turn applied.

Fundamental Turns or Bandages.—A *circular* bandage is applicable to cylindrical parts, the turns being applied at right-angles to the long axis of part and each turn exactly overlapping the preceding (Fig. 5).

A *spiral* bandage covers a part in a spiral manner. Beginning with a circular turn to fix the bandage, it is then carried slightly upward and spirally around the part, each turn

paralleling the preceding one which it overlaps from one-half to two-thirds its width. The spiral bandage may be *ascending* or *descending* depending upon whether the succeeding turns approach or recede from the trunk. The ascending spiral is the one generally employed. A slow spiral covers a conical part slowly, leaving no gaps (Fig. 7, *a*). A rapid spiral proceeds up the part rapidly, leaving gaps between turns (Fig. 7, *b*).

A *spiral reverse* bandage is used under those conditions where the shape of the part to be covered is that of a rapidly increasing cone. Here, in order to have the bandage lie flat, and yet permit no gaps, the direction of spiral turns must be changed. The *reverse* accomplishes this and is made as follows: When in the application of spiral turns, a point is reached where by reason of the increased conical shape of the part, the bandage, in order to lie flat and not lose its parallelism to the last turn, or to prevent gaping, must be reversed, then the body of

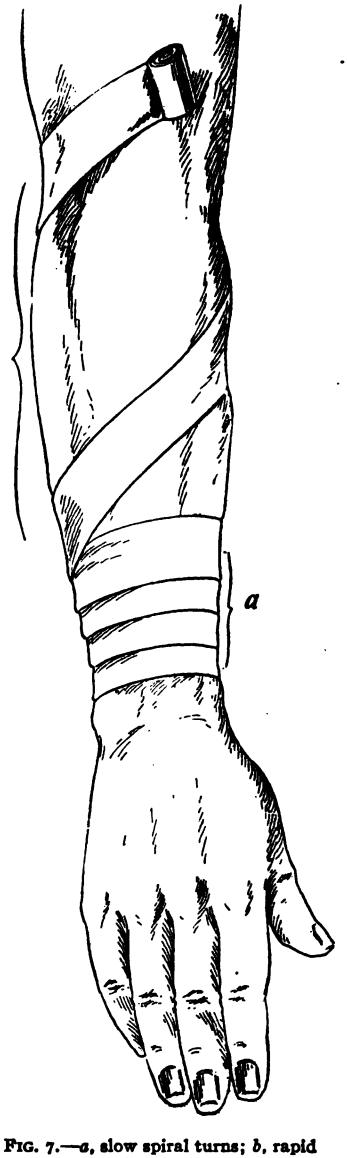
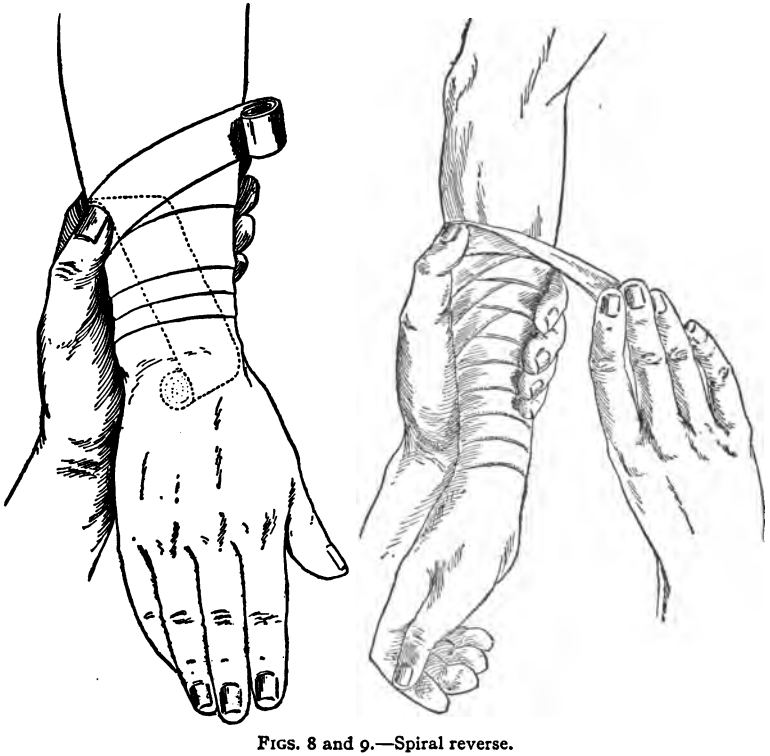


FIG. 7.—*a*, slow spiral turns; *b*, rapid spiral turns.

the bandage is unrolled five or six inches, the thumb of the left hand is placed on the upper edge of the last turn, and held firmly to prevent loosening (Fig. 8). Relax the pull with the right hand, approximating the part and at the same time pronate the hand, thus turning over or reversing the body of the bandage. Carry the bandage directly down



FIGS. 8 and 9.—Spiral reverse.

the long axis of the limb and then obliquely to the right until the turned upper edge meets the left thumb (dotted line in Fig. 8). Pass the roller around the limb (Fig. 9) the lower edge overlapping one-half the previous roll. It is then grasped by the fingers of the left hand, the left thumb still remaining at the reverse. Now

give gentle traction to settle the reverse in place. Reverses are always made toward the operator or toward the smaller end of the cone and should not be employed unless needed.

Figure-of-8 turns are the ones most used in bandaging. The bandage consists of two loops made in the form of an eight (8) and are usually employed in covering a joint or in place of a spiral reverse. When a number of figure-of-8 turns are applied, each a little higher or lower, overlapping a portion of each preceding turn, so as to give an imbricated

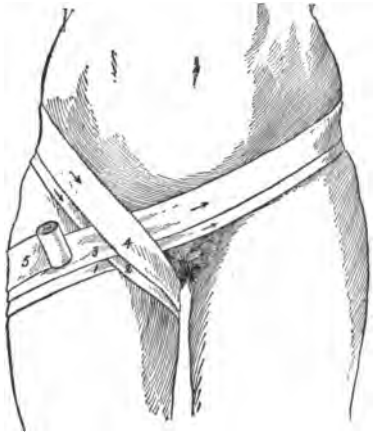


FIG. 10.—Figure-of-8 turns. (Ascending spica.)

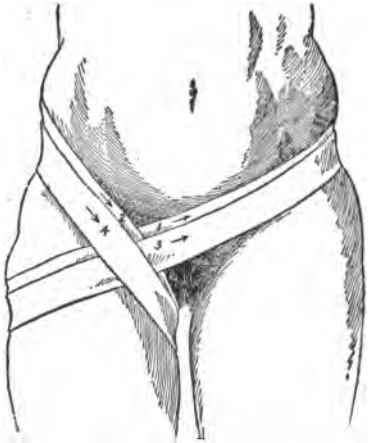


FIG. 11.—Figure-of-8 turns. (Descending spica.)

appearance it is called a spica (Fig. 10). The spica is *ascending* (Fig. 10) or *descending* (Fig. 11) depending upon whether the turns proceed up or down the part.

Recurrent turns are used to cover the scalp (Fig. 12), stumps, and extremities. First, fix the initial extremity by circular turns, then reverse and pass backward and forward over the part to be covered, applying the first turn over the centre and each succeeding turn alternating on each side. Complete the bandage by reversing after the last recurrent turn and applying two or three circular turns over the first or fixation turns.

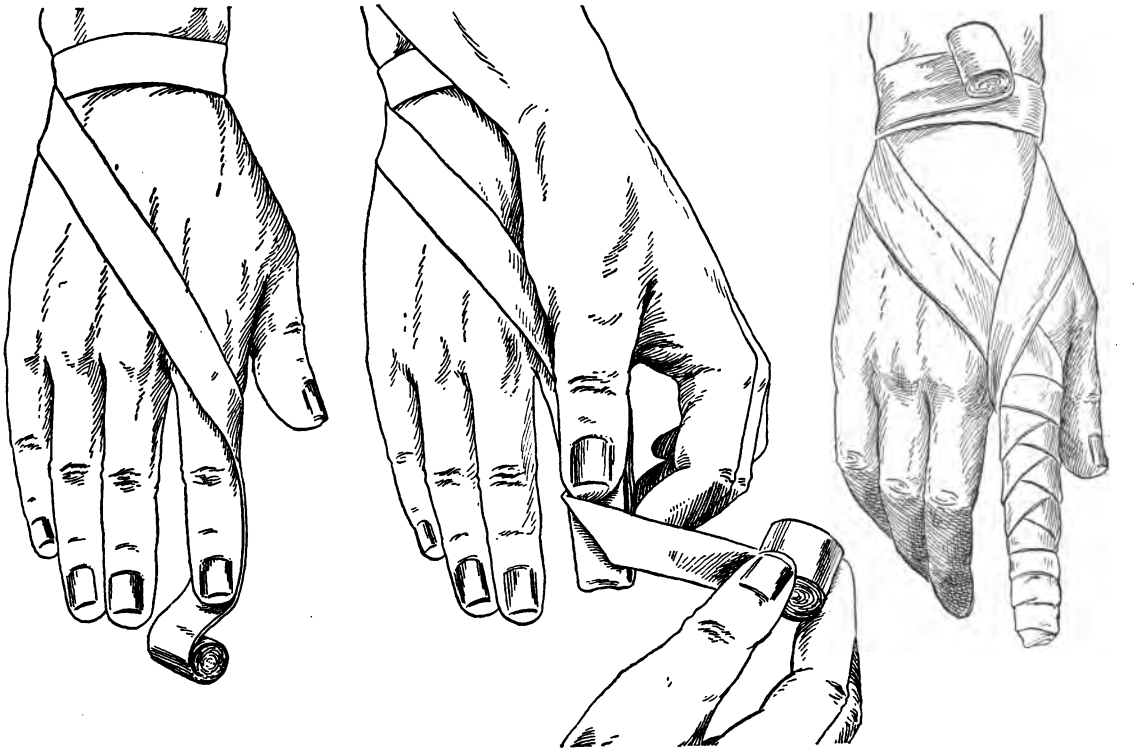
For years the classical bandages have been taught the same way with but few modifications. Many useless turns have been retained to the present day, although daily proven unpractical and useless clinically. The classical bandage will be given below, also those modifications that seem of more practical use than the original.

Spiral of Finger (Fig. 17, Ring Finger) (Bandage 3 Yards x 1 Inch).—Fix bandage by circular or oblique turns around the wrist. Carry diagonally across dorsum of hand to base of finger. Encircle the finger by a rapid spiral in the same direction until the root of the nail is reached. Cover in the finger with spiral turns progressing to the base of the finger by overlapping each previous turn one-half the bandage width. On completion of the finger carry the bandage across the dorsum of hand and down around the wrist. All the turns, both wrist and finger should be in the same general direction.

FIG. 12.—Recurrent turns.

Spiral Reverse of the Finger (Figs. 13, 14 and 15) (Bandage 3 Yards x 1 Inch).—Fix the bandage by two circular turns, or an oblique turn around the wrist, then carry it diagonally over the dorsum of the hand to the base of the finger. Descend the finger by a rapid spiral covering the tip by two or three recurrent turns, holding the turns with the forefinger and thumb of the left hand. Now reverse the last dorsal turn and carry the bandage around the finger, with

FIG. 13. FIG. 14. FIG. 15.



FIGS. 13, 14 and 15.—Spiral reverse of finger.

spiral reverse turns, in the same direction of the first turns around the wrist. Continue these turns, overlapping one-half to one-third, until the upper edge of the bandage reaches the finger web. Then direct the two circular turns around the wrist.

Demigauntlet Bandages (Fig. 16) (Bandage 3 Yards x 1 Inch).—Fix the bandage around the wrist. Carry the band-

FIG. 16.—Demigauntlet bandage.

FIG. 17.—Gauntlet with spiral of ring finger.

age across the back of the hand and loop around the base of the thumb or little finger, then back to wrist and around it in same direction. By applying repeated similar turns around each successive digit, the entire dorsum of the hand is covered.

Gauntlet Bandage (Fig. 17) (Bandage 3 Yards x 1 Inch).—This bandage is simply composed of spiral reverse

bandages of all the digits. Each digit, beginning with either the first or fifth, is covered in order with the spiral or spiral reverse turns, care being taken that all the turns on each

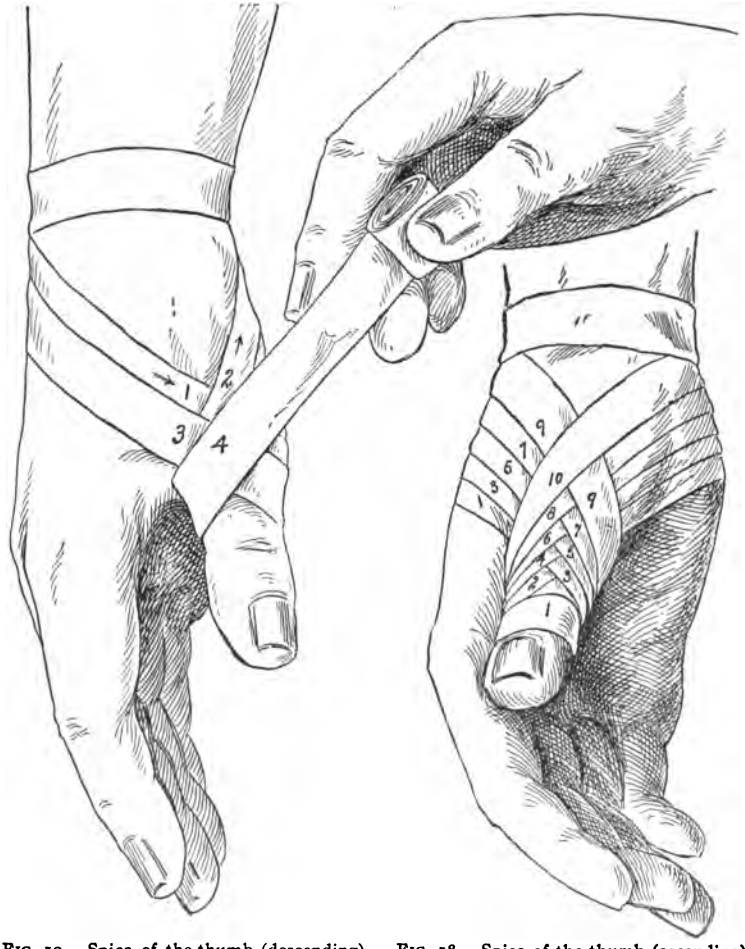


FIG. 19.—Spica of the thumb (descending). FIG. 18.—Spica of the thumb (ascending).

finger have the same direction around the wrist and fingers. No turns should cross the palm.

NOTE.—The reader will notice that in none of the illustrations is the fixation turn designated by a number. The No. 1 is always found on the first turn characterizing the bandage depicted.

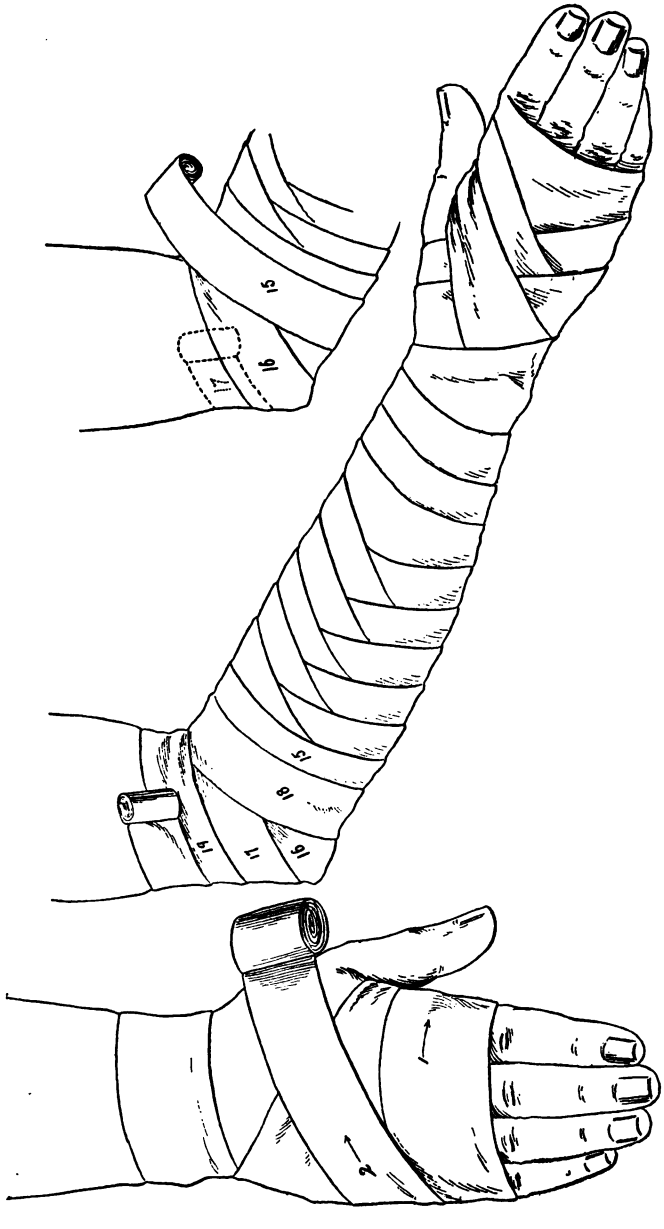


FIG. 20.

FIG. 21.

FIGS. 20 and 21.—Spiral reverse of the upper extremity.

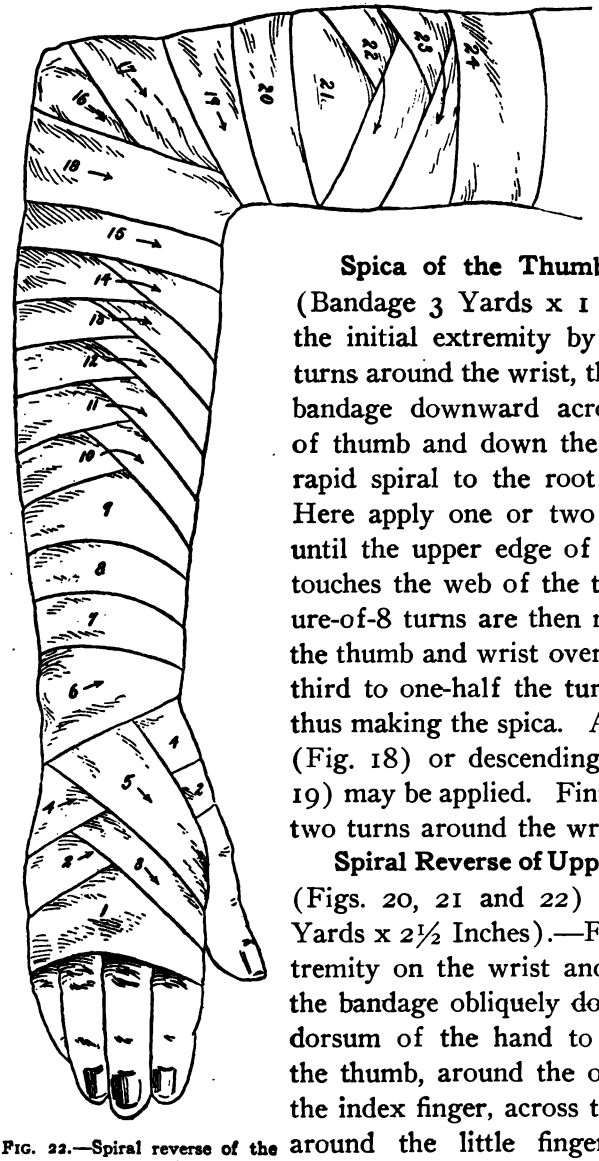


FIG. 22.—Spiral reverse of the upper extremity.

Spica of the Thumb (Fig. 18) (Bandage 3 Yards x 1 Inch).—Fix the initial extremity by one or two turns around the wrist, then carry the bandage downward across the base of thumb and down the thumb by a rapid spiral to the root of the nail. Here apply one or two spiral turns until the upper edge of the bandage touches the web of the thumb. Figure-of-8 turns are then made around the thumb and wrist overlapping one-third to one-half the turn preceding, thus making the spica. An ascending (Fig. 18) or descending spica (Fig. 19) may be applied. Finish by one or two turns around the wrist.

Spiral Reverse of Upper Extremity (Figs. 20, 21 and 22) (Bandage 5 Yards x 2½ Inches).—Fix initial extremity on the wrist and then carry the bandage obliquely down over the dorsum of the hand to the web of the thumb, around the outer side of the index finger, across the palm and around the little finger, with the lower edge of the turn crossing the

second joint of the ring finger. Make a circular turn at this point and as the bandage crosses the little finger the second time, it should cover one-half the preceding turn. Then carry obliquely upward across to and around the first joint of the thumb. Crossing the palmar surface again to ulna side another turn is taken around the hand below the thumb, overlapping one-half the previous turn. Now make one or two figure-of-8 turns around the hand above and below the thumb, until the hand is covered. Next carry the bandage to the wrist and cover the forearm with spiral or spiral reverses as required until within four inches of the elbow. Flex the elbow and carry the bandage with its centre over the point of the elbow, and return to front of forearm covering one-half or one-third the last turn. The bandage is carried from here across the front of the elbow and up around the lower part of arm overlapping one-half of the turn covering the elbow tip. The next turn passes around the upper forearm covering in the lower edge of the elbow turn. Proceed from here on up the arm with spiral reverse turns as required. Finish with one or two circular turns.

Spica of the Shoulder (Fig. 23) (Bandage 8 Yards x 2½ Inches).—Fix the initial extremity by a circular turn around the upper arm, having the upper edge reaching the axillary folds. It is next carried obliquely upward and across the prominence of the shoulder around the chest under the opposite axilla and returned crossing the previous turn over the shoulder at a point midway between chest and back. Now make a loop around the arm then around the body. Repeat this last figure-of-8 turn until the shoulder is covered, the turns rising higher in ascending and getting lower in descending spica (Fig. 24), each overlapping the last turn one-half to two-thirds over the shoulder, but exactly covering the preceding turns under the opposite axilla. In applying this bandage the operator stands beside and facing the shoulder

that is being bandaged. To bandage the left shoulder fix the initial extremity from before backward high up on the arm by one or two circular turns then passing backwards and upwards over the shoulder tip and around the back. It is much more secure to fix your spica bandage of the shoulder by a spica loop beginning well away from the shoulder and looping the arm as do the subsequent turns (Fig. 24). Here the initial extremity lies hidden under turn (1) posteriorly.

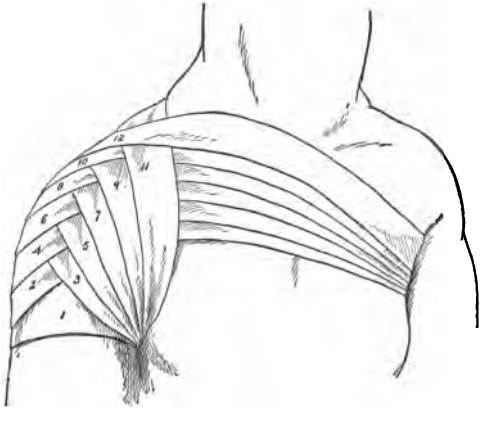


FIG. 23.—Spica of the shoulder.

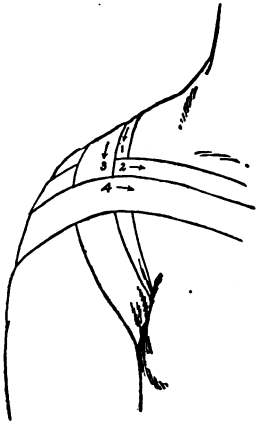


FIG. 24.—Spica loops of the shoulder.

Spiral Reverse of the Lower Extremity (Fig. 25) (Bandage 8 Yards x 2½ to 3 Inches).—Fix the initial extremity obliquely across the ankle-joint, then carry the bandage diagonally down across the dorsum of the foot to ball of great toe (if on right foot), under the foot and around the base of the small toe. A circular turn here and then one or two spirals are made until the instep is reached, when reverses are used up to the point of the instep. The next turn instead of reversing passes up around the ankle low down, then down around the foot and up the outside of the foot around the ankle (figure-of-8 turns) covering one-half the

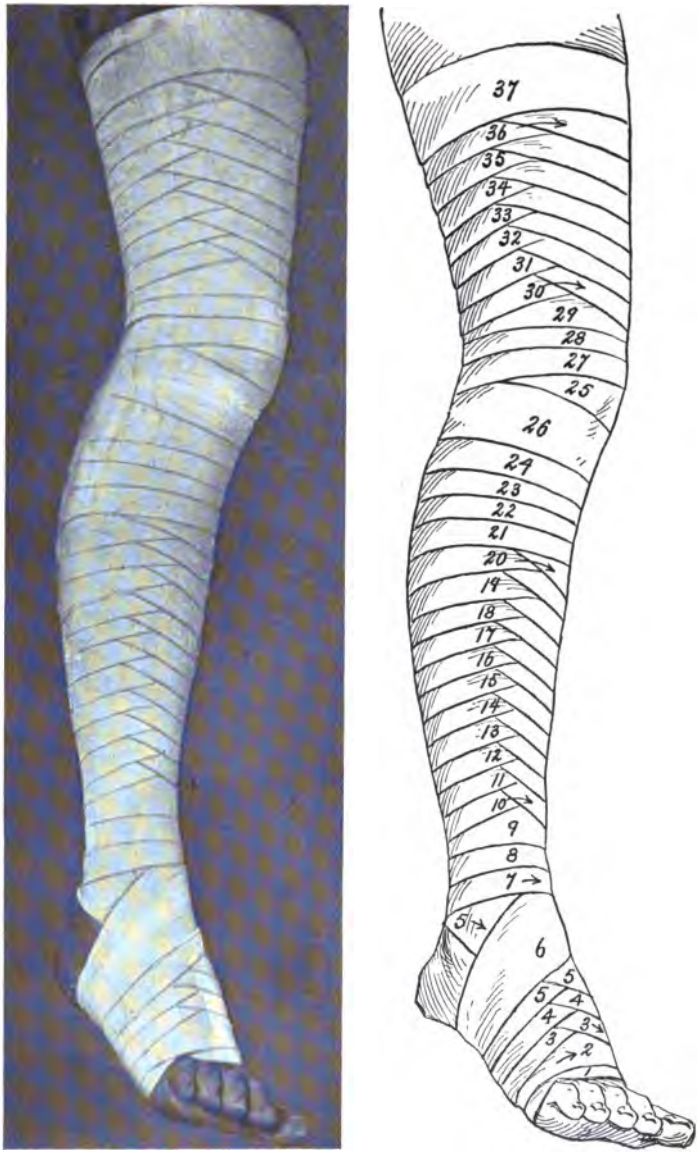


FIG. 25.—Spiral reverse of lower extremity.

previous turn, the foot turns approaching the heel, the ankle turns receding from the heel. The bandage is now carried up the leg with spiral and, as needed, spiral reverse turns until the upper edge of the last turn reaches the lower border of the patella (with leg extended). Pass the next turn directly over the patella (knee-cap) and a succeeding turn over the lower half of the patella after which the upper half is covered with a turn and the bandage then carried up the thigh with spiral reverse turns. When desiring to bandage the left foot, the first turn after fixation of the bandage is obliquely down across the instep to the base of the little toe, under foot, and around the great toe base, then proceed as above. This bandage is very difficult to retain in place if the leg is dependent or in use. It is best used therefore in reclining cases. For ambulatory cases the figure-of-8 bandage is preferable.

Spiral of the Foot Covering the Heel (Figs. 26 and 27) (Bandage 3 Yards x 2 Inches).—To bandage the right foot, fix the initial extremity around the ankle obliquely; then pass down diagonally across instep to ball of great toe, around the sole and around the base of little toe and up on the dorsum. A circular turn here is followed by spiral or spiral reverse turns until the apex of instep is reached. The bandage is then carried with its centre over the point of the heel, up the outside of the foot to instep, then down the inner side of foot obliquely, under the sole, transversely across the outer side of the heel, behind the tendo Achilles, back to the instep, down the outer side of foot, obliquely under the sole, transversely across the inner side of the heel, behind the tendo Achilles and back to the instep. End bandage by circular turns around the ankle. For left foot, fix bandage as for right foot, the bandage being applied toward the operator's right hand, then carry obliquely down across instep to base of little toe, proceeding from here as for right foot.

FIG. 26, *a*.

FIG. 26, *b*.

FIG. 27.

FIG. 26.—*a*, Spiral of foot covering the heel; *b*, second stage.
FIG. 27.—Spiral of foot covering the heel.

Spica of the Foot (Figs. 28 and 29) (Bandage 3 Yards x 2 Inches).—Fix the bandage around the ankle, then, for right foot, carry the turn obliquely across the dorsum of the foot to the ball of the great toe. A circular turn is made around the base of the foot across and up the instep, around the heel. The upper edge of the bandage should just grasp the heel, the lower edge being left loose. Now return to the

FIG. 28.—Spica of the foot (first step).

FIG. 29.—Spica of the foot.

lower instep crossing the last turn in the middle of the foot and covering two-thirds of the width of the bandage. Repeat similar alternate turns around the foot and the heel taking care that those on the foot approach the heel and that those on the back of the heel ascend the ankle. The upper edge of the last turn around the foot should cover the lower edge of the first turn around the heel. The bandage is ended by one or two circular turns around the ankle. It will be noted that

the last one or two turns crossing under the foot have one edge loose. This can be avoided by reversing the bandage on the side of the foot before going up the instep. To bandage the left foot, after fixing the bandage around the ankle in the above manner, direct the next down across the instep to the

FIG. 30.—Figure-of-8 of the leg (method 1).

base of the little toe and then make a circular turn around the ball of the foot. From this point proceed as for right foot.

Figure-of-8 of the Leg (Fig. 33) (Bandage 5 Yards x 2 or 3 Inches.—*Method 1* (short loop method) (Fig. 30): The bandage is similar to the spiral reverse of the lower ex-

FIG. 31.—Figure-of-8 of the leg (method 2).

tremity until, on ascending the calf, reverses are needed. Then incline the bandage rapidly upward by rapid spiral or oblique turn to lie flat, make a turn around the leg and returning

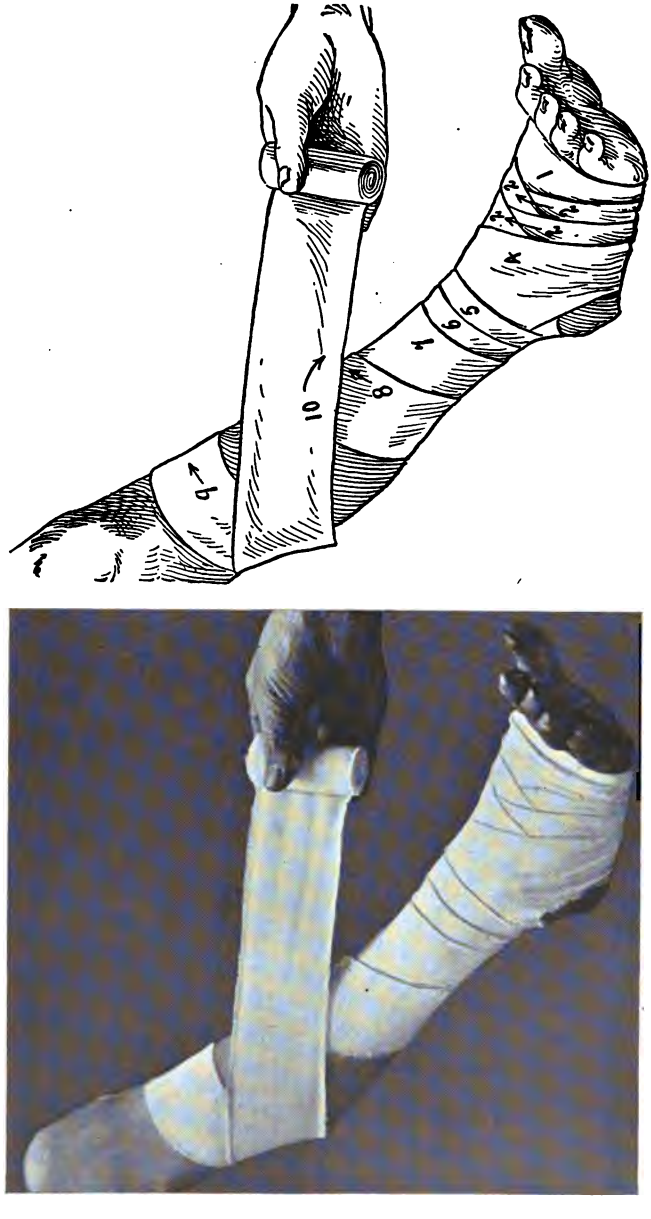


FIG. 32.—Figure-of-8 of the leg (method 3).

in downward direction to front of leg, cross the first turn just outside the crest of the tibia. Successive similar turns of the figure-of-8 variety are made overlapping one-half of each previous turn as the bandage ascends the leg. It will be noted that there is a gap posterior between the two loops of the 8 and that the lower edge of the upper loop does not lie flat. Both of these defects are covered by the ascending turns as they ascend the leg. Complete the bandage by two circular turns above the calf.

Method 2 (long loop method) (Fig. 31): This makes use of a large loop below and a small loop above when starting the figure-of-8 turns, both approaching the place of greatest diameter where two circular turns end the bandage.

Method 3 (Fig. 32): Likewise similar to the spiral reverse until the increased diameter of the calf demands reverses. Then a long loop of the figure 8 carries the bandage above the greatest diameter of the calf where a circular turn passes directly around the leg above the calf and then descends, crossing the long loop just outside the crest of the tibia to pass across the lower leg in a short loop. There turns are repeated, each large loop covering one-half the last turn and each circular turn passing above the greatest diameter of the calf.

The figure-of-8 of the leg is a very popular bandage and reasonably so, for it retains its place better than any other leg bandage. The increased amount of bandage necessary for its application is its only objection. All three methods give the same appearance when completed (Fig. 33).

Spica of the Groin (Figs. 34 and 35) (Bandage 8 Yards x 3 Inches).—The initial extremity is fixed by two circular turns high up around the thigh. If the right groin is to be bandaged, from the outer surface of the thigh the bandage is carried diagonally across the groin just above the pubis and around the crest of the iliac (hip) bone of the left side,

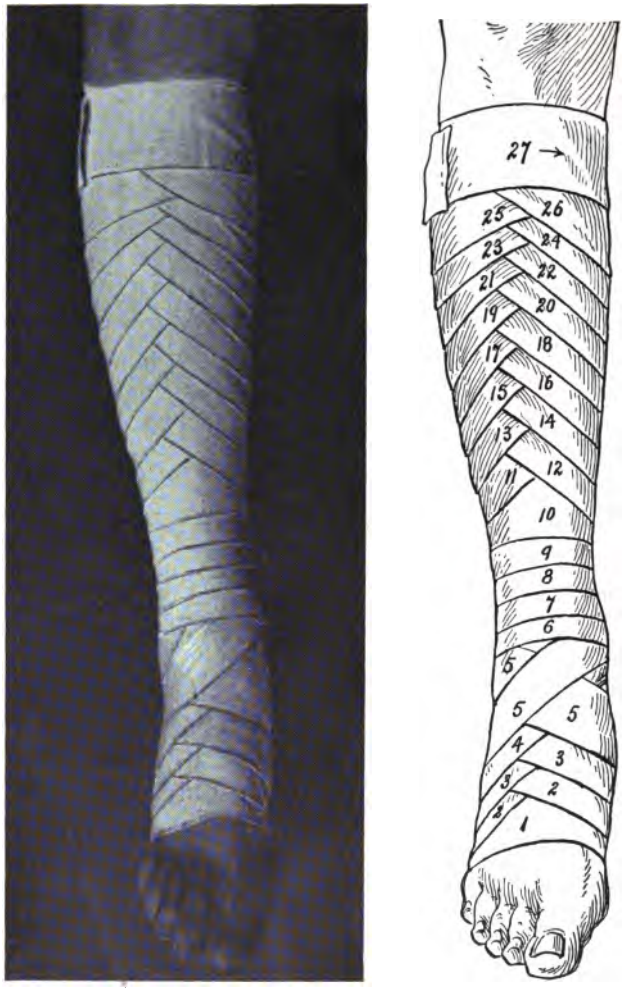


FIG. 33.—Figure-of-8 of the leg.

thence across the lower back, between the right iliac (hip) crest and trochanter. From here the turn passes obliquely downward and crosses the first ascending turn, about the middle of the groin. Apply three or four of these figure-of-8 turns, each turn covering about one-half the previous turn

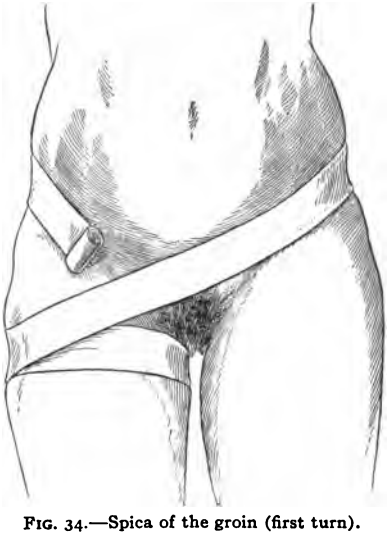


FIG. 34.—Spica of the groin (first turn).

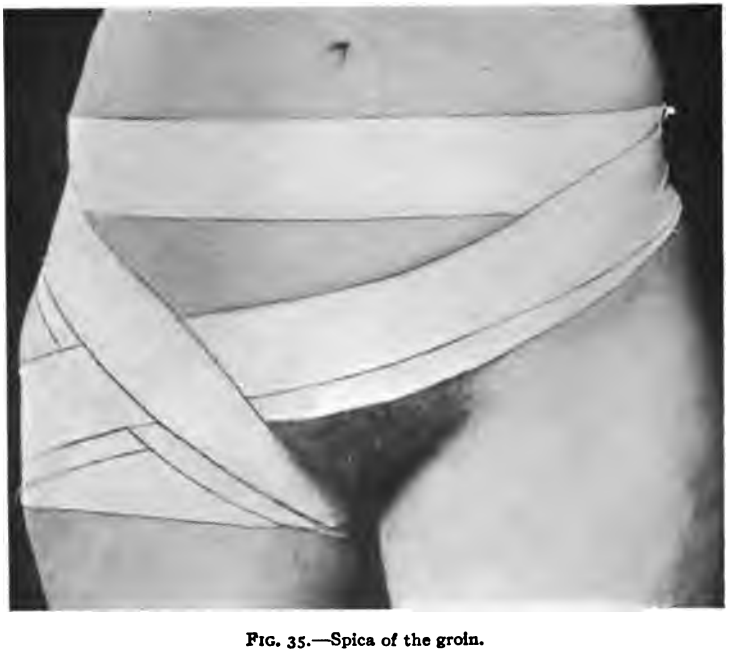


FIG. 35.—Spica of the groin.

as it rounds the thigh and groin but always passing around and below, not above, the iliac crest on its course around the pelvis permitting the upper turns to grasp the hip bones but not to pass above them. The bandage is usually ended by a circular turn around the pelvis just below the crests. There is a much more practical and secure method of applying the spica of the groin, by starting the bandage with the initial

FIG. 36.—Spica of the groin.

extremity passing over the groin obliquely and around the thigh, thence across above the symphysis and continued as above. This is finished with the spica turns and not by circular turns around the trunk or thigh (Figs. 37 and 38). Should it be desired to bandage the left groin the circular turns around the thigh pass from within toward the outer surface. The first ascending turn passes obliquely in the line of the groin up to and between the opposite crest and

the trochanter. The remaining turns are exactly similar to the ones applied for the right groin.

Double Spica of the Groin (Figs. 39 and 40) (Bandage 8 Yards x 3 Inches).—Fix the initial extremity by two circular turns on the right thigh as high as possible. Direct the bandage from the outer aspect of the thigh, across the groin, above the symphysis pubis, around the pelvis gripping the crest on each side, diagonally across lower abdomen, crossing

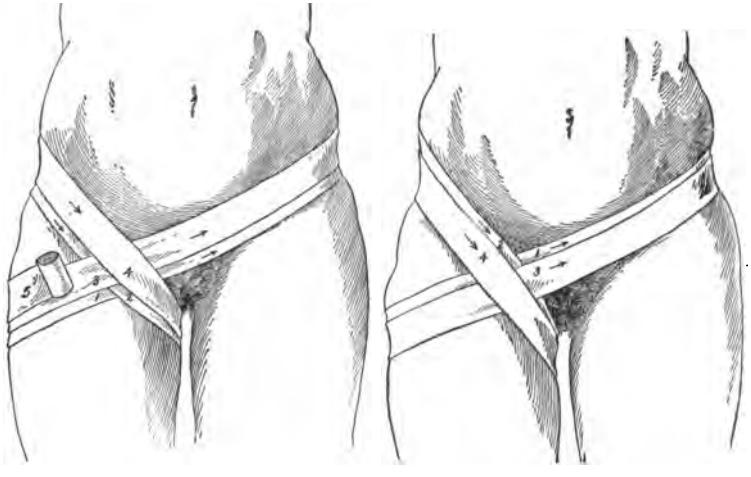


FIG. 37.—Spica of the groin (ascending) with oblique fixation.
FIG. 38.—Spica of the groin (descending) with oblique fixation.

the previous turn just above the symphysis whence it reaches the outer surface of the left thigh. Make a circular turn around the thigh, as high up as possible and on the second arrival on the inner aspect of the left thigh carry the bandage up the line of the groin around the left iliac crest and then make a complete circular turn around the pelvis. When the right side is reached the second time, drop obliquely downward along the right groin to the point of starting. The remaining bandage is merely a repetition of this one com-

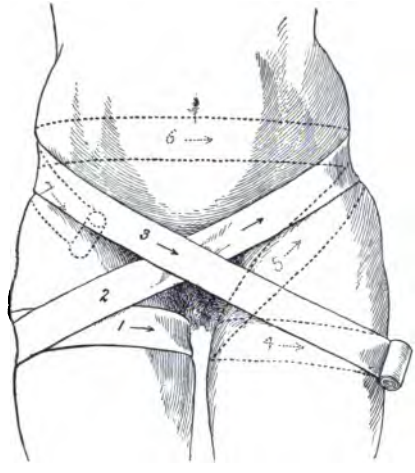


FIG. 39.—Double spica of the groin (first turn).

FIG. 40.—Double spica.

plete turn, covering about one-half each previous turn. When the bandage is completed there will be noted three spicas; one in each groin and one over the symphysis. This bandage, as well, can be applied with the same modifications as are made in the single spica of the groin, namely, omission of the horizontal turns around the pelvis and thigh. Here too, this spica bandage may be either ascending or descending.

Crossed Bandage of the Perineum (Figs. 41, 42 and 43) (Bandage 8 Yards x 3 Inches).—Start the bandage crossing the lower abdomen and left groin diagonally, passing behind

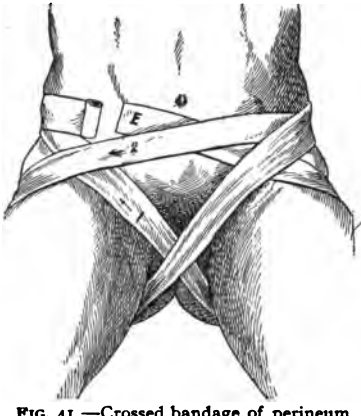


FIG. 41.—Crossed bandage of perineum (first turn).

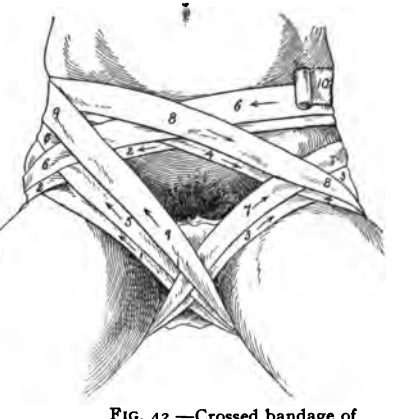


FIG. 42.—Crossed bandage of perineum.

and well up on the left thigh, crossing the perineum to right groin (1). From here carry the roller along the line of the right groin around the iliac (hip bone) crests, diagonally across the abdomen (2) and around the posterior aspect of the thigh high up. From here the bandage crosses the first turn in the perineum proceeding up the line of the left groin (3) around the left hip, grasping the crest of the hip bone, across the back around the right hip crest diagonally across the abdomen (4), to pass around the outer and posterior aspect of the thigh high up, thus completing one entire turn. It should be noticed that the initial extremity, *E*, is covered by

turn 4 as it crosses the abdomen in the same direction. Crossing the perineum direct the bandage, overlapping two-thirds the width of the previous turns, along the right groin (5), around right crest, around the back and left crest, diagonally across the abdomen (6), around the outside of the right thigh, posteriorly, to cross the perineum. Now pass up the

FIG. 43.—Crossed bandage of the perineum.

line of the left groin (7), around the left hip across the back around the right hip down across the abdomen (8), around the outside of the left thigh posteriorly and across the perineum. Passing up the right groin (9), continue around back to left side (10), etc., until a sufficient number of turns are applied. The bandage should show four series of spicas as seen in the illustrations.

The bandage may be applied, fixing the initial extremity around the thigh and alternating the direction of the spica perineal turns. This older method has no advantage over the above and is much more confusing.

Posterior Figure-of-8 of Shoulders and Back (Fig. 44) (Bandage 5 Yards x 2 Inches).—Standing behind the patient apply the initial extremity of the bandage on the posterior

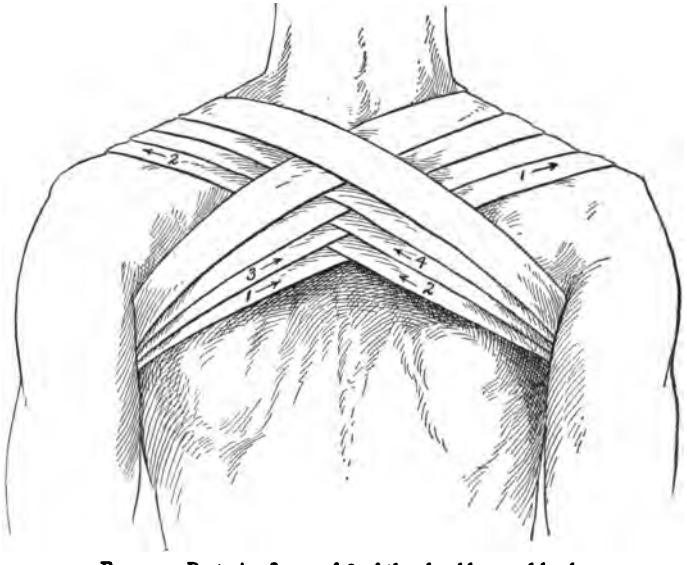


FIG. 44.—Posterior figure-of-8 of the shoulders and back.

aspect of the sound axilla. Carry the bandage obliquely across the back to pass over the opposite shoulder well out on the point, down through the axilla to its posterior border then across the back to the other shoulder going around it and through the axilla to point of starting. Repeated turns five or six in number, proceeding up the back and toward the base of the neck, by each turn overlapping the preceding one, completes the bandage. The finished bandage shows a spica midway the shoulders.

Anterior Figure-of-8 of Shoulders and Chest.—This bandage is similar to the above, differing only in that it is applied anteriorly over the chest rather than posteriorly over the back.

Suspensory of the Breast (Fig. 45) (Bandages 8 Yards x 3 Inches).—To bandage the right breast fix the bandage

FIG. 45.—Suspensory of the breast (right).

by two circular turns around the chest just below the breast, passing from patient's right to left. On arriving beneath the right breast the second time direct the next turn upwards between the breasts and across the left shoulder, then down across the back to point of starting beneath the right breast. Repeating these turns alternately for four or five times com-

pletes the bandage. The horizontal turns ascending by overlapping one-half and the oblique turns proceed outward over the breast overlapping about one-half the width of each previous turn. The points of crossing should be just under the breast. The turns as they pass over the shoulder tend to overlap each other much more than when crossing the breast.

FIG. 46.—Suspensory of the breast.

To bandage the left breast fix the bandage by circular turns as for right breast. On arriving beneath the left breast carry the bandage upward under the axilla across the back, over the right shoulder down between the breasts to point of starting. Alternate turns finish the bandage as on the right side (Fig. 46).

Suspensory of Breast (Fig. 47) (Bandage 8 Yards x 3 Inches).—To bandage the right breast apply the initial extremity of the roller at the inner and upper aspect of the affected breast. Carry the bandage well out on the point of the opposite shoulder loop under the axilla, then cross the previous turn on the point of the shoulder. Passing diagonally down across the back around the side and under the

FIG. 47.—Suspensory of the breast.

affected breast to point of starting. Fix with a second turn drawing both snugly. Repeat this figure-of-8 turn six or eight times overlapping the preceding turns two-thirds of the bandage width over the breast and four-fifths the width over the point of the shoulder. The succeeding turns approach the neck, covering in the breast and opposite shoulder. The bandage is a poor one.

Suspensory of Both Breasts (Fig. 48) (Bandage 8 Yards x 3 Inches).—Start the initial extremity under the right breast and fix by two circular turns, then carry the bandage obliquely up under the right breast, and over the left shoulder, obliquely across the back and under the right breast, across

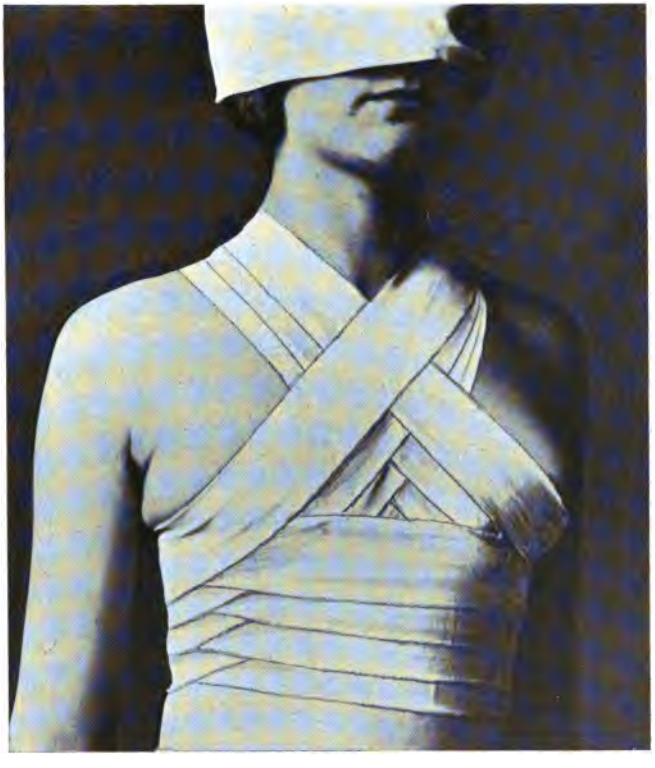


FIG. 48.—Suspensory of both breasts.

under the left breast overlapping one-half the previous horizontal circular turn. Pass, then, diagonally across and up the back over the right shoulder, down under the left breast and around the back to the starting point. This is one complete turn which repeated four or five times finishes the bandage. Horizontal turns should ascend as they overlap

and oblique turns should advance outward and upward on the breasts as they overlap.

Figure-of-8 of the Breasts (Kiwisch) (Figs. 49 and 50).—After applying two or three turns of a suspensory of both breasts, cover the breasts by three or four spiral turns and then by three or four figure-of-8 turns to compress the breasts, passing under the right breast over the left breast,

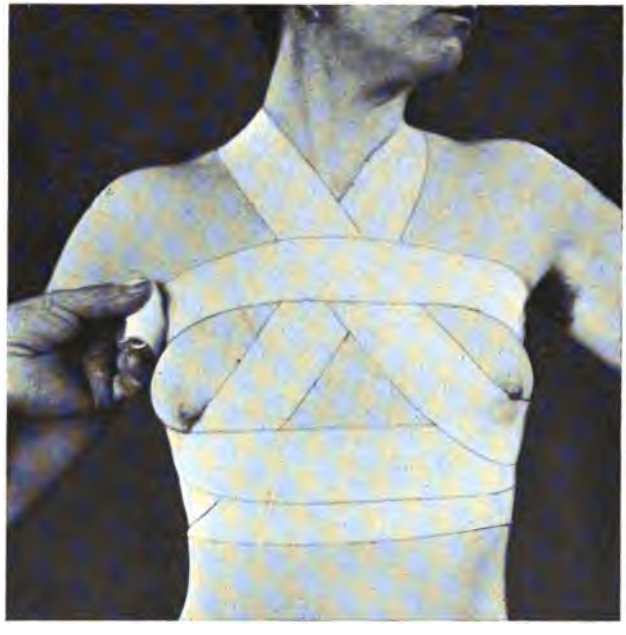


FIG. 49.—Figure-of-8 of the breast.

around the back, then over the right breast under the left breast and around back. Repeat three or four times, ending the bandage by a circular turn across both breasts.

Desault (Fig. 51) Bandages 3 Rollers Each 8 Yards x 3 Inches).—Pad triangular in shape, base 2 to 2½ inches, thickness tapering to nothing and five or six inches long. Place the wedge-shaped pad in the axilla of injured side. It should be the proper size to fill the wedge space between the abducted

arm and the chest. Hold in place by ascending spiral turns of the thorax, the last two turns passing up across the trunk, over the opposite shoulder, looping around the upper arm, back over the shoulder and across the trunk to axilla of affected side. The addition of this turn completes the original Desault, not being found in the modified Desault (*first roller*). The arm is brought against the pad and the fore-

FIG. 50.—Figure-of-8 of the breast.

arm to a right angle. Place the initial extremity in axilla of sound side and then by descending slow spiral turns, each overlapping one-half the bandage width, the arm is bound to the side from the level of the anterior axillary fold to the bend of the elbow (*second roller*).

Third Roller. Place the initial extremity in the posterior aspect of the sound axilla, then carry the bandage diagonally

across the back over the affected shoulder, just grasping the point of the shoulder with the bandage firmly enough to prevent slipping back or front. Carry the turn from here down the front of the arm, under the elbow and across the back to the point of starting. Now carry the bandage forward under the sound axilla, across the chest, over the affected

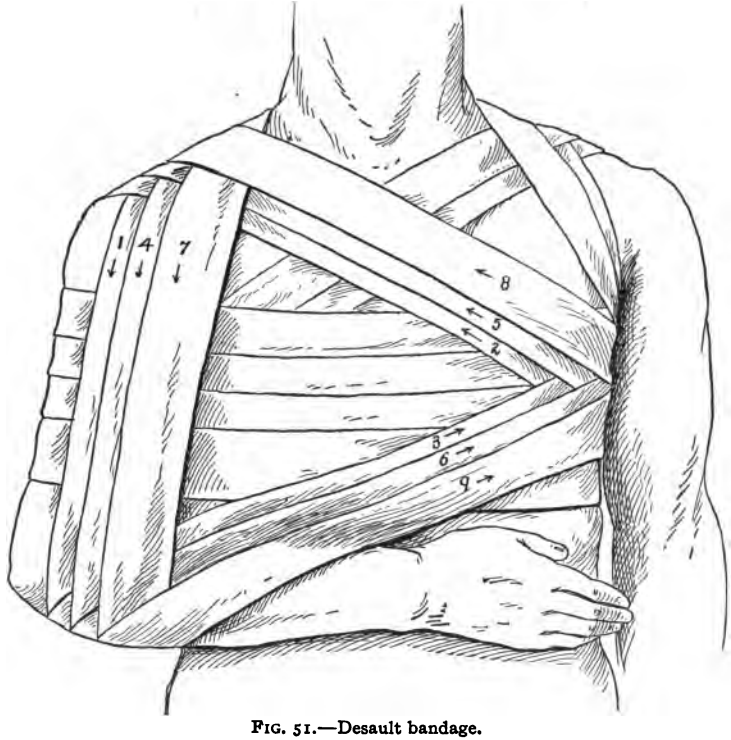


FIG. 51.—Desault bandage.

shoulder down behind the arm, under the elbow in front of the upper part of the forearm, across the chest to the sound axilla. Three turns, each covering two-thirds of the previous turn, usually suffice. A few circular turns may finish the bandage. The forearm is slung from the neck. It will be noticed that the roller just described forms a triangle in

front and in back. Its direction of application can readily be remembered by the use of the key A. S. E., each letter representing one of the three, axilla, shoulder, elbow. The original Desault is composed of three rollers but the modified bandage is the one most popular at the present day.

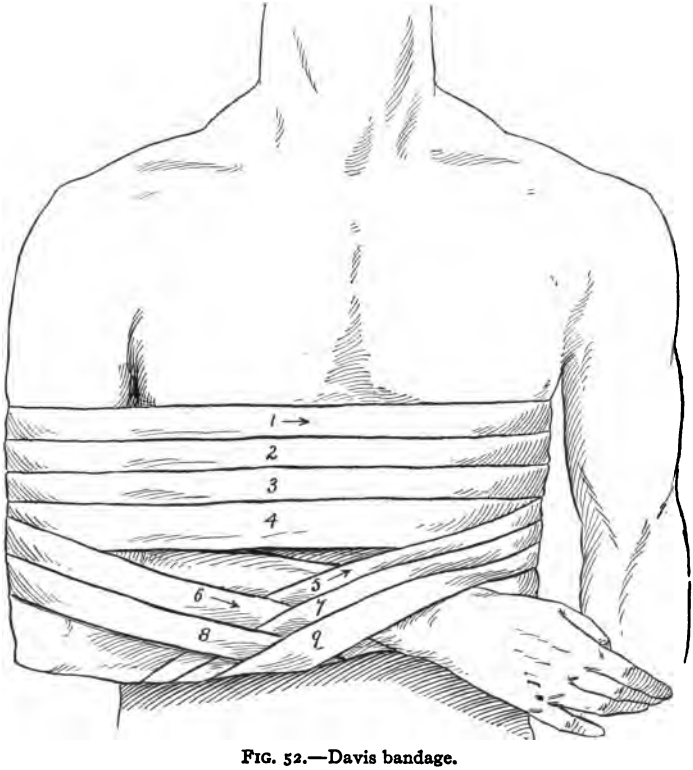


FIG. 52.—Davis bandage.

The modified Desault omits the first roller, retaining the second and third roller in detail.

Davis Bandage (Fig. 52) (Bandage 8 Yards x 2½ Inches).—Fix the initial extremity by passing two or three circular turns around the lower chest and right arm, from patient's right to left. On arriving behind the affected elbow

carry the next turn down diagonally in front and around under the forearm, to pass under the elbow obliquely, over the front of the forearm, over the wrist and around the back. Then pass around over the affected elbow in front of the forearm and under the wrist to back. Repeat these last two turns alternately three or four times, overlapping about two-thirds the succeeding turns, forming a spica in front of the

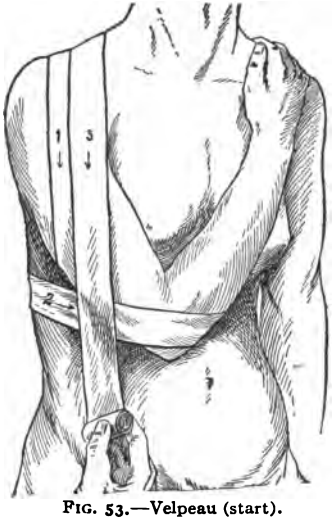


FIG. 53.—Velpeau (start).

forearm. Finish by two or three circular turns around chest and arm, if desired.

To bandage the left side apply the turns as above except on arriving at the sound side carry the bandage under the forearm in front of and around the lower arm and elbow across the back, then over and around the forearm, under the elbow and around the back. Finish as above.

Velpeau (Modified) (Figs. 53, 54, 55 and 56) (Bandage 8 Yards x 3 Inches).—Place the hand of the affected side, on the opposite shoulder thereby bringing the elbow near the midline of the body. This position pushes the shoulder up-

ward, outward and backward. Place the initial extremity in the axilla of the sound side, posterior aspect. Carry the bandage across the back to a point well out on the shoulder, down around the arm about the position of the deltoid tubercle. From here the bandage passes behind the elbow, between it and the body, crossing the chest to the point of

FIG. 54.—Velpeau.

starting. Fix this turn by a similar one, completely overlapping it. Then from the same point of starting the bandage is carried across the back horizontally, crossing in front of the elbow, confining the arm and forearm, but leaving the tip of the olecranon exposed. Alternate vertical and horizontal turns are now employed to complete the bandage. The

vertical turns overlap two-thirds approaching the neck and elbow but not passing over the point of the elbow. The horizontal turns overlap one-half the previous turns and are continued as high on the chest as the axillary folds will allow.

Another modification of the Velpeau is described as fol-

FIG. 55.—Velpeau (side view).

lows (Fig. 57): With the upper extremity in the same position as above, fix the bandage by spiral turns around the arm and thorax; when the roller reaches the axilla of the well side it passes up across the back, over the shoulder well out on the point, down the front of the arm, under the elbow, up the back of the arm, over the tip of the shoulder and

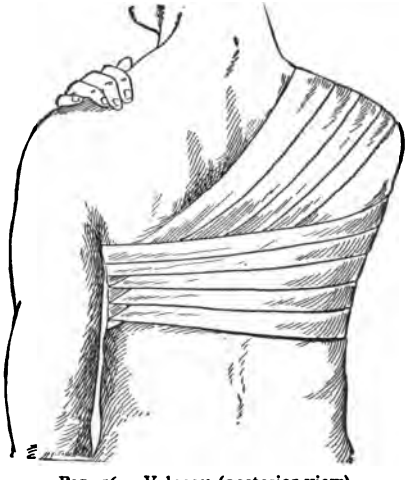


FIG. 56.—Velpeau (posterior view).

FIG. 57.—Velpeau modified.

across the chest to the point of starting. Repeated turns overlapping upward and inward accomplish the bandage.

Velpeau Modified (Dulles) (Fig. 58) (Bandage 8 Yards x 3 Inches).—With the right upper extremity in the Velpeau position fix the bandage by two circular turns just above the elbow passing around the arm, forearm and chest. On arriv-

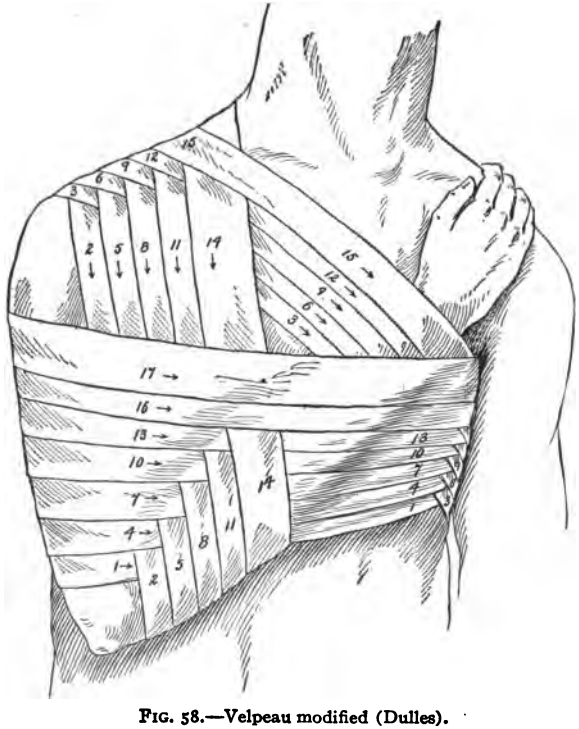


FIG. 58.—Velpeau modified (Dulles).

ing in the sound axilla carry the bandage obliquely up across the back, over the point of the shoulder of the injured side, down in front of the arm, under the elbow, up the back of the arm over the point of same shoulder, then diagonally across the chest and forearm to the base of sound axilla, finishing with a circular turn similar to the fixation turns.

Repetition of these turns five or six times overlapping about two-thirds of each succeeding turn complete the bandage, bringing the last turn well up in the axilla, close to the neck, and half-way up the forearm.

Figure-of-8 of the Head and Neck (Fig. 59) (Bandage 3 Yards x 2 Inches).—Fix the initial extremity around forehead and just below the occiput. On arriving below the left ear the second time, drop down below the occiput, around the neck and back to below the occiput. From here carry the

FIG. 59.—Figure-of-8 of the head and neck.

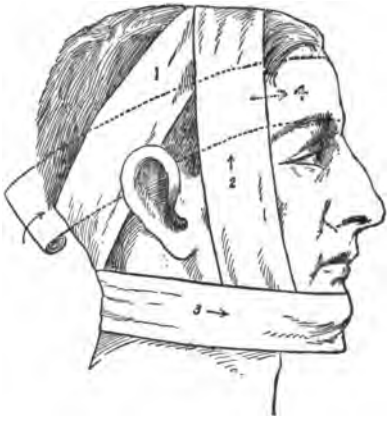


FIG. 60.—Barton bandage.

bandage over right ear around forehead over left ear, back to just below occiput. Repeat this figure-of-8 turn two or three times, overlapping upward or downward as desired. The bandage may be applied without the fronto-occipital circular turns.

Barton Bandage (Fig. 60) (Bandage 5 Yards x 2 Inches).—Place the initial extremity on the nape of the neck just behind and below the left ear. Carry the bandage beneath the occipital protuberance between the opposite ear and the parietal eminence, thence obliquely over the head to mid-

line anterior to the highest point of scalp. From here pass down the left side of the head and face under the chin up beside the face, crossing the previous turn in the middle line on top of the head. It is next carried between the left parietal eminence and ear to point of starting, when a turn is made horizontally around front of the chin. Three such complete turns usually suffice, each exactly covering the last. A modified "Barton" (see dotted line) is described starting with two circular occipitofrontal turns, then passing from

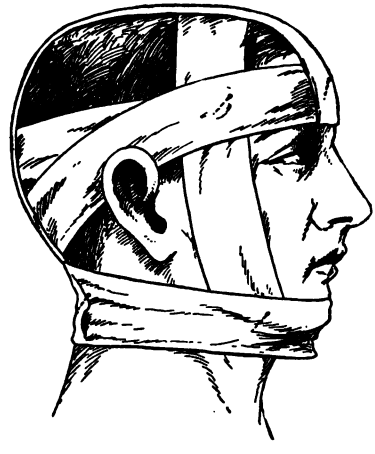


FIG. 61.—Gibson bandage.

occiput down under the ear around the chin and back to occipital protuberance. From here the bandage is similar to the original "Barton." Except that two more occipitofrontal turns complete it.

Gibson Bandage (Fig. 61) (Bandage 5 Yards x 2 Inches).—Place the initial extremity on the right temple and carry the roller over the front of the top of the head, down over the opposite temple, under the chin and up to the starting point. Add two more similar turns exactly overlapping. When at the right temple again, reverse, and carry the band-

age around the head and forehead, just above the ears. Repeat this turn twice. From a position above the right ear carry the bandage posterior, under the occipital protuberance and then around the anterior aspect of the chin. Repeat this turn twice. Returning to the nape of the neck a reverse is made and the bandage carried over the centre of the head to end on the horizontal turns in the centre of the forehead. Pin all intersections. This bandage is poor and seldom used.

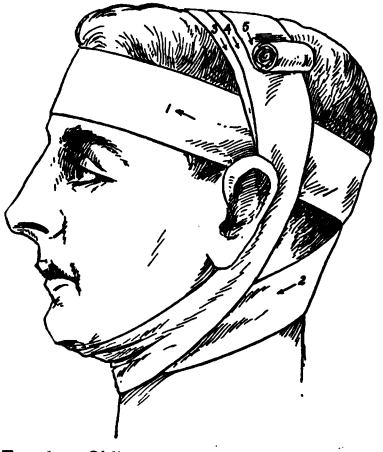


FIG. 62.—Oblique of the jaw (reverse side).

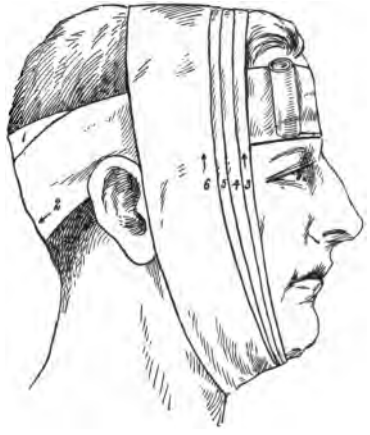


FIG. 63.—Oblique of the jaw (right side).

Oblique of the Jaw (Figs. 62 and 63) (Bandage 5 Yards x 2 Inches).—To bandage the right side of the jaw, place the initial extremity on the right temple and carry the bandage by two circular turns from before backward around the head and forehead above the ears. On the third arrival over the right ear carry the bandage down under the occipital protuberance, around under the jaw and up the right side of the face, having the anterior edge of the bandage just posterior to the outer angle of the eye. Thence it is carried over the head and down back of the left ear, under the jaw and again up the right side of the face posterior to the first turn and over-

lapping it one-half on the affected side and exactly covering the previous turn on the sound side. Repeat two or three times and, on arrival above the left ear, reverse the bandage and carry around the head in circular turns immediately over the fixation turns. Instead of reversing above the left ear the last turn may be carried under the chin, below the right ear, around under the occiput, ending in circular turns overlapping the fixation turns. The bandage of the left side

FIG. 64.—Double oblique of the jaw.

of the jaw is started over the left temple and carried backward in circular turns. From this point the bandages are identical.

Double Oblique of the Jaw (Fig. 64) (Bandage 5 Yards x 2 Inches.—Place the initial extremity on the right temple and fix by one or two fronto-occipital turns. On arriving above the left ear, drop down across the back of the neck, under the right ear, under the chin, and then carry it up the left side of the face just back of external angle of the eye. Carry the bandage over the front of the head, between parietal eminence and the right ear, down back of the neck, under the left ear, under the chin, up the right side of the face,

just back of the external angle of the eye, across the front part of the head crossing the previous turn in the midline, back over the left ear to the nape of the neck. Repeat these turns two or three times, exactly overlaying the preceding turns except the turn at the side of the face where they overlap two-thirds or more in a backward direction. End the bandage by one or more fronto-occipital turns.

FIG. 65.—Recurrent of the scalp (first step).

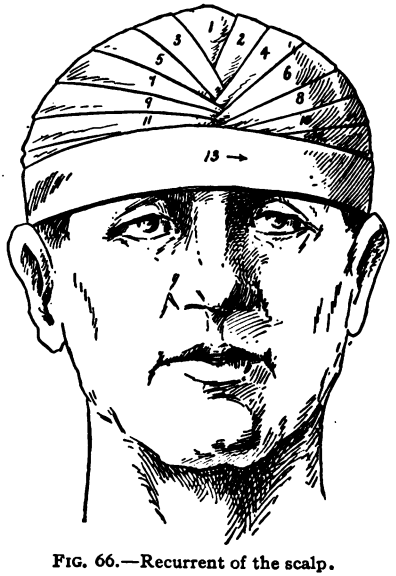


FIG. 66.—Recurrent of the scalp.

Recurrent of the Scalp (Figs. 65 and 66) (Bandage 5 Yards x 2 Inches).—Fix the bandage by one or two circular turns, horizontally around the head, above the eyebrows and ears but below the occipital protuberance. This is important to give support to the bandage and prevent displacement upwards. On arriving at the occiput, reverse, and carry the bandage over the middle of the head and to midpoint on the circular turns in front. Again reverse and carry back to the occiput covering in one-half of the first turn. Continue to carry it backward and forward on alternate sides of the head

until the scalp is covered, when the bandage is completed by two circular turns. In the application of the recurrent turns, the turns must of necessity be held front and back until the circular turns can bind them in place.

Transverse Recurrent of the Scalp (Fig. 67) (Bandage 3 Yards x 2 Inches).—Fix the initial extremity over one ear by two occipitofrontal turns. On arriving again over the left ear, reverse the bandage, carry directly over the vertex to just below the right ear. Here, again, reverse and carry back

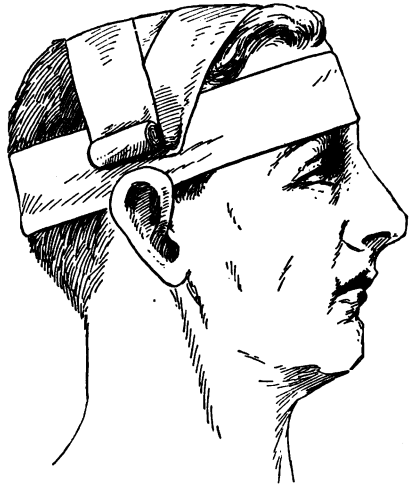


FIG. 67.—Transverse recurrent of the scalp (first steps).

to above the left ear covering in one-half the previous turn. Continue such recurrent turns alternately proceeding toward the forehead and toward the occiput until the entire scalp is covered and the last turns develop into circular turns, covering the fixation turns. The recurrent turns must be held on both sides by operator and an assisting hand until the final circular turns bind them in position.

Recurrent of Scalp with Double Roller (Fig. 68) (Bandage 5 Yards x 2 Inches).—The centre of the roll is placed on the forehead and the two ends carried back to the occiput.

Here the left hand roller crossing under the right hand roller is reversed and carried over the centre of the scalp to the root of the nose. It is crossed here by the right hand roller which has made a circular turn overlapping the fixation turns. Again reversing the original left hand roller, recurrent turns are made alternate on each side the scalp, each loop being caught by the right hand or circular roller. Continue such recurrent turns until, overlapping two-thirds the bandage

FIG. 68.—Recurrent of the scalp with double roller.

width, the entire scalp is covered. Then the smaller roller is cut and the larger one takes two extra circular turns. The double roller has the advantage over the single in that one pair of hands can apply it.

Monocle or Crossed Bandage of One Eye (Fig. 69) (Bandage 5 Yards x 2 Inches).—To bandage the left eye, fix the initial extremity on the left temple by a circular turn around the head from left to right. When the roll is above the right ear, incline the bandage down behind the head, under the left ear and across the left eye, the lower edge of the bandage crossing the root of the nose. It next passes over the right

side of the top of the head and down to the back of the neck. Repeat this turn two or three times overlapping one-half the width of the bandage, ascending on the cheek and descending on the scalp. Finish with a circular turn around the head.

Binocular or Crossed Bandage of Both Eyes (Fig. 70) (Bandage 5 Yards x 2 Inches).—Bandage the left eye as just described and after finishing the circular turn, pin it at the back of the head. Then bring it up over the left side of the

FIG. 69.—Crossed bandage of the eye.

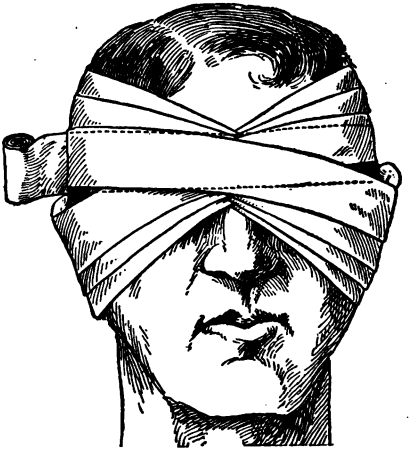


FIG. 70.—Crossed bandage of both eyes.

head, down across the root of the nose, over the right eye, low on the cheek, and under the right ear, back to the occiput. Finish just as in the left eye.

Both eyes can be bandaged simultaneously. After applying the first turn crossing the left eye, carry the bandage around the head above the ears, then down across the root of the nose, across the cheek covering the ear. Then a full turn around the head. Repetition completes bandage (Fig. 70).

The binocle can be applied with the double roller, carrying the rollers each back over an ear crossing posteriorly and returning on opposite sides under the ears, again crossing each other at the root of the nose.

PART II

MISCELLANEOUS BANDAGES

Tailed Bandages (Figs 71, *a* and *b*, and 72).—These may be three tailed, or the " T " bandage, the four tailed and the many tailed.

Perineal " T " Bandage (Fig. 71, *a*).—One example of the " T " bandage consists of a narrow strip long enough to more than encompass the waist and usually 2½ inches to 3

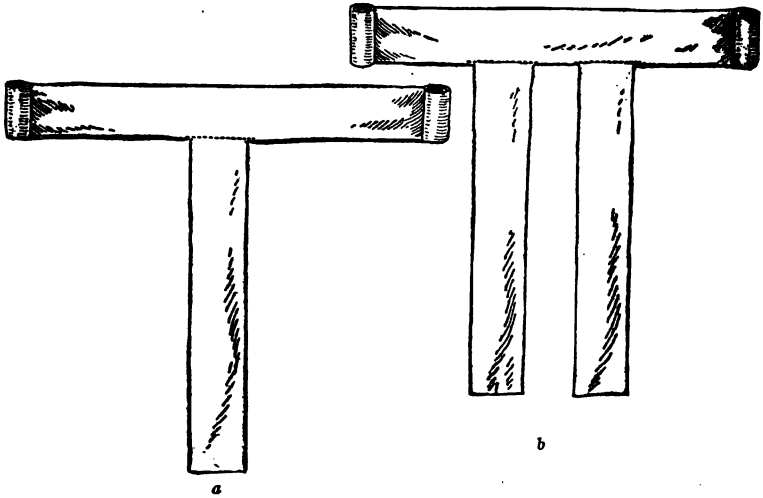


FIG. 71.—*a*, "T" bandage; *b*, four-tailed bandage.

inches wide. At this centre is sewed a similar strip three or four inches wide making the stem of the " T." This is split at its free end for a short distance, to enable it to be easily torn. It is used to hold dressings against the perineum. The cross bar of the " T " goes around the waist with the stem posterior, from which position it is brought through the perineum and torn down the desired length to pass on each side of the genitals. The two ends are tied together around

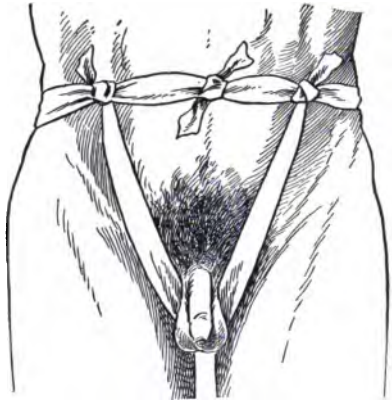


FIG. 72.—"T" bandage of the perineum.

FIG. 73.—Modified "T" bandage of the perineum.

the waist, like a belt, and the two perineal strips brought up and tied to the belt (Fig. 72).

Perineal Bandage (Cunningham) (Figs. 73 and 74).—

This consists of a waist band 48 inches long and 3 to 5 inches wide. To the centre of this and at right angles to it are sewed one upon the other two strips, 4 inches wide and 36 to 40 inches long. The anterior strip is split. The belt is applied around the waist and tied in front, the split strips crossed in the perineum behind the elevated scrotum and tied or pinned to the belt. The untorn strip is then brought up covering the penis and scrotum and fastened to the belt.

FIG. 74.—Modified "T" bandage of perineum.

The "T" Bandage of the Scalp (Fig. 75) (Bandage Width 2 to 3 Inches).—With the junction of the stem and bar of the "T" over the forehead, side of head or the occiput, the horizontal limb is carried around the forehead and occiput just above the ears. The stem is carried across the top of the head and the three ends tied or pinned together.

The "T" Bandage of the Eye (Fig. 76).—Into the angle between the stem and the bar of the "T" sew a right angle

triangle of gauze or muslin, cut the size and shape to suit the case. Carry the limbs of the bar around the head above the ears, and the stem under the chin and up the opposite side

FIG. 75.—"T" bandage of the scalp.

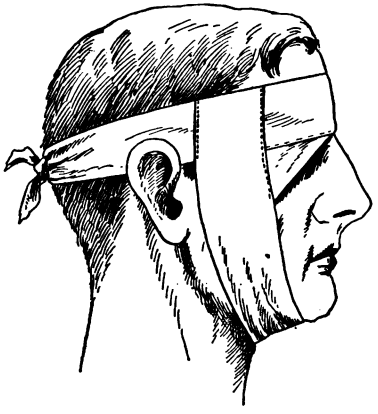


FIG. 76.—"T" bandage of the eye.

FIG. 77.—"T" bandage of the ear.

of the face to meet and be attached to the horizontal ends by pin or knot.

The "T" Bandage of the Ear (Fig. 77).—Sew across the junction of the two limbs a triangle of fabric, equilateral

in type, cut to suit the case. Pass the horizontal limbs around the head above the ears and the stem under the neck to meet the horizontal limbs. Fasten the three ends by tying or pinning.

Bandages of similar construction can be fitted to the groin, buttock, and scrotum (Figs. 78 and 79).

FIG. 78.—"T" bandage of the groin.

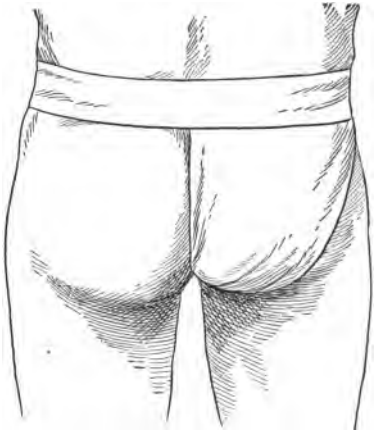


FIG. 79.—"T" bandage of the buttock.

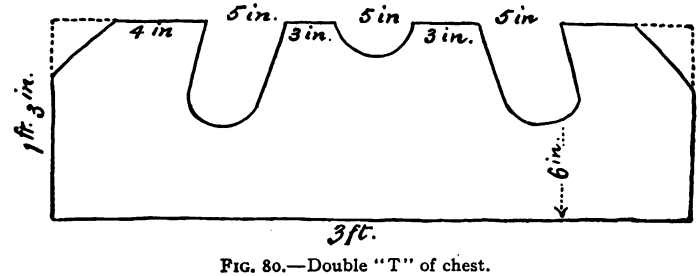


FIG. 80.—Double "T" of chest.

The Double "T" of the Chest (Fig. 80).—The best example of this is the Murphy binder made of the shape and dimensions shown in Fig. 80. A simpler dressing is made by taking a strip of material 8 to 10 inches wide and long enough to encompass the chest easily. Four inches from the

centre of one edge, two strips, two inches wide and twelve inches long, are sewn one on each side of the centre. The wide strip passes around the chest well up in the axilla and the two strips pass over the shoulders and are attached to the upper edge of the wide strip opposite.

The Four-tailed Bandage of Chin (Fig. 81).—This is made by tearing a piece of material the desired width, and two or three feet long, one-third or three-fourths the distance from its middle point to the end. Its chief use is for a

FIG. 81.—Four-tailed bandage of the chin.

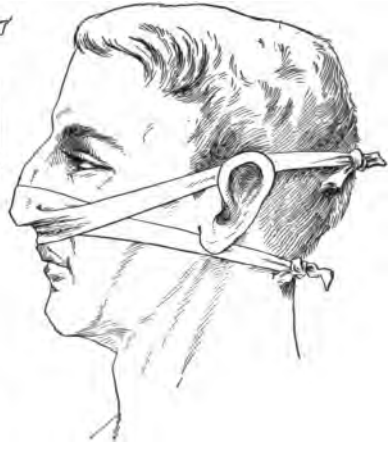


FIG. 82.—Four-tailed bandage of the nose and lip.

fractured inferior maxilla. The untorn portion is placed on the chin and the two upper ends tied behind the neck, while its lower ends are tied over the head. Then tie the ends from the knot on top of the head to the ends from the knot back of the neck.

Four-tailed Bandage of the Nose and Upper Lip (Fig. 82).—A piece of material, preferably gauze, three inches wide and two feet long is torn down both ends to within an inch of the centre. The body of the bandage is placed over the nose and lip, the ends carried back, the upper ones tied

at the back of the neck and the lower ones tied back of the head.

Quadrangle Bandage of Occiput (Fig. 83).—A piece of material, 4 to 5 inches wide and 26 to 30 inches long, is torn down the centre of each end, one-third the length of the entire strip. The untorn portion is placed over the occiput and the torn ends are crossed on each side. The two upper ends are tied under the jaw and the two lower ends are tied across the

FIG. 83.—Quadrangle bandage of the occiput.

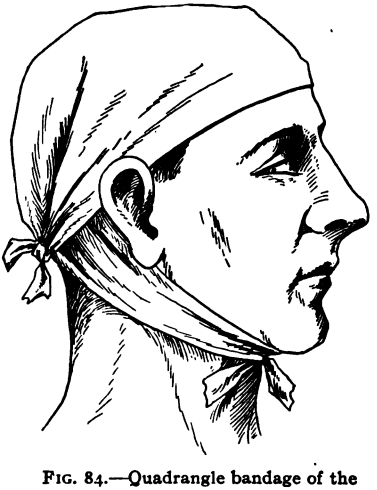


FIG. 84.—Quadrangle bandage of the vertex.

forehead. The dressing may be so cut as to leave the ears uncovered.

Quadrangle Bandage of the Vertex (Fig. 84).—This bandage is similar in construction to that of the occiput. Its body or untorn portion is placed over the vertex, while its front ends are passed above the ears and tied under the occiput, the back ends cross over these and are tied under the jaw.

Quadrangle Bandage of Neck (Fig. 85).—Similar in construction to the above bandage. The body is placed well down on the nape of the neck and the ends tied as in figure.

Quadrangle Bandage or Sling of the Shoulder (Fig. 86).

—A piece of material 6 to 8 inches wide and long enough to more than encompass the shoulder and chest is torn down its centre from each end to within 4 or 5 inches of its centre. The body of the sling is placed over the shoulder, the two

FIG. 85.—Quadrangle bandage of the neck.

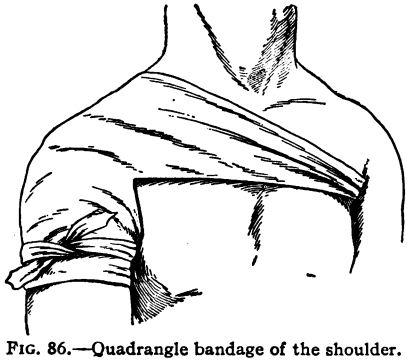


FIG. 86.—Quadrangle bandage of the shoulder.

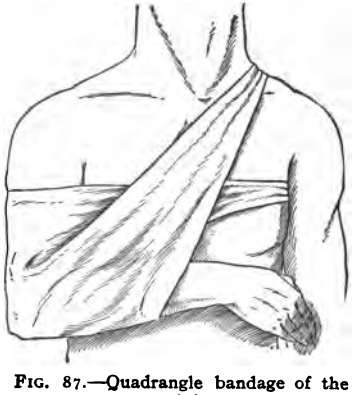


FIG. 87.—Quadrangle bandage of the arm and forearm.

upper ends, carried one around each side of the thorax, are tied under the opposite axilla, the two lower ends are crossed under the axilla of the affected side and tied around the arm.

Quadrangle Bandage or Sling of Arm and Forearm (Fig.

87).—A piece of material, 10 to 12 inches wide, is prepared as in the sling of the shoulder. A slit is cut in the centre of the body to receive the point of the elbow. The upper ends pass directly around the trunk and are fastened under the opposite arm. The lower ends are carried diagonally across the trunk and fastened over the opposite shoulder.

Many Tailed Bandages (Scultetus) (Fig. 88).—This consists of a piece of muslin or gauze of the desired width and long enough to more than surround the part. Into each end, tears are made about 2 inches apart for a distance of a

FIG. 88.—Many tailed bandages.

few inches. It is used to retain dressings that need frequent changing and is applied under the part, the tails being brought up on each side and each corresponding pair tied, the lowest pair is first tied in a single knot and the end tucked under the next pair which is tied down and so on until the last pair is reached and tied by a bow knot. The opposite ends may be overlapped and each pair pinned with a safety pin, rather than tied.

Swathes.—Are merely wide pieces of cloth that are used to go around a part, and are fastened with pins. A

common swathe is used to retain an upper extremity in the acutely flexed position (Fig. 89). A piece of cotton or gauze, the width of the shoulder from base of neck to acromion and long enough to make a figure-of-8 around the flexed elbow and body, is passed horizontally between the flexed elbow and body, with its middle opposite the elbow. The front end is

FIG. 89.—Swathe.

now carried up around the forearm and over the shoulder of the affected side, diagonally across the back and under the axilla of the opposite side. Here it is pinned to the other end which has been brought over in front of the flexed extremity. The latter end is continued as a circle about the thorax posteriorly and is pinned to the part surrounding the flexed arm. This dressing is a very excellent one for use in

fractures and injuries in and immediately around the elbow-joint.

Handkerchief Bandages (Fig. 90, *a*).—Handkerchief bandages are made of handkerchiefs or other material in the shape of a square which varies in size to suit the need. The sides of the square are usually 20 to 24 inches long. This folded once in the form of a right angle triangle constitutes the handkerchief or triangle bandage commonly known as a "sling." When folded repeatedly on itself in the same direc-

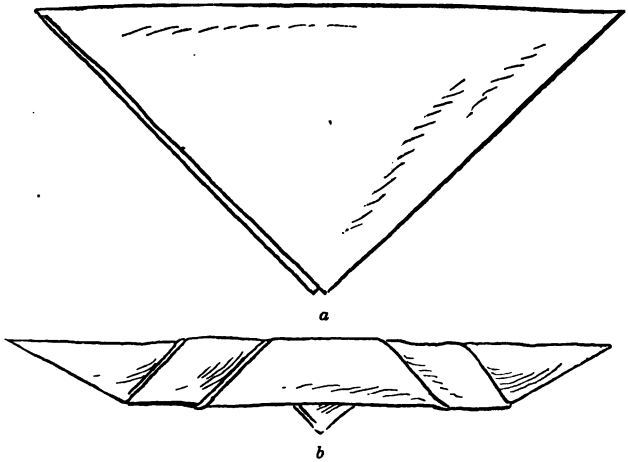


FIG. 90.—Handkerchief *a*, cravat *b*.

tion it becomes the "cravat" bandage (Fig. 90, *b*). The materials used are silk, gauze, muslin, light duck and linen.

The handkerchief bandage is the most adaptable of all the forms of bandages. It can be substituted for the roller bandage and the tailed bandages and can be used as a tourniquet. Its chief usefulness, is as a sling in emergency dressing, (for handkerchiefs are almost everywhere obtainable) and to retain cumbersome dressings that demand frequent changing.

The long side of the triangle is its base, the right angle is the apex and the acute angles make the extremities or ends of the bandage.

When the bandage is applied it derives its name from the part of the anatomy with which its base comes in contact. The ends are usually knotted preferably with a flat or reef knot so placed as to make the least possible pressure.

Occipitofrontal Triangle (Fig. 91) (Bandage Base 30 Inches).—Place the base of the triangle just below the most prominent part of the back of the head, draw the apex forward and down over the forehead. Draw the ends around the head over the ears and knot over the forehead. Turn

FIG. 91.—Occipitofrontal triangle.

FIG. 92.—Fronto-occipital triangle.

the apex up over the knot and pin it. By drawnig the sides of the apex snugly down over the both ears you have two secondary apices which may be turned up and pinned (dotted line).

Fronto-occipital Triangle (Fig. 92).—Similar to the one above except it is applied from before, backward.

Bitemporal Triangle (Fig. 93).—This also is similar to above, differing only in that it is applied with the base over the temporal region.

Verticomental Triangle (Fig. 94) (Bandage Base 36

Inches).—The base is placed on the front of the top of the head and the apex is carried back to the nape of the neck. The ends are carried down one on each side of the face, crossed under the jaw then drawn around the neck on each side and tied over apex. The apex is turned up and pinned.

Auriculo-occipital Triangle (Fig. 95).—Place the base of the triangle on the side of the face in front of the ear, the apex pointing backward. Carry the ends to the opposite

FIG. 93.—Bitemporal triangle.

FIG. 94.—Verticomental triangle.

side in front of the ear. The apex is brought around the back of the head and folded back over the two ends which are united over it. Pin the apex back.

The Triangle of the Head (Figs. 96 *a* and *b*) (Hunter's Cap.).—Square of material 28 inch side. Fold the handkerchief across one inch from its middle. With the shorter side under, turn the corners of the folded edge in to meet each other. With the extremities of the large triangle held on the stretch, roll the base of the triangle upon itself as far as the edge of the shorter posterior layer. Lift the bandage and on relaxing the tension the two layers will separate.

Apply the single posterior layer over the head, with the edge surrounding the face. The rolled edge is pulled down around the back of the neck and the ends tied under the jaw.

FIG. 95.—Auriculo-occipital triangle.

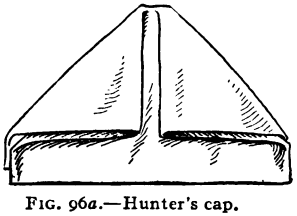


FIG. 96*a*.—Hunter's cap.

FIG. 96*b*.—Hunter's cap.

Square Cap of the Head (Figs. 97 *a*, *b* and *c*).—(1) Use a handkerchief with sides long enough to tie over the vertex

and under the chin. Fold it across an inch from its centre and place it over the top of the head with the free edges over

FIG. 97*a*.—Square bandage of the head (method 1).

FIG. 97*b*.—Square bandage of the head (method 2).

FIG. 97*c*.—Square bandage of the head (method 3).

the forehead, the longer one being next the scalp. Tie the two outer corners under the chin. The two inner corners are pulled forward until the posterior edge fits snugly to the

back of the neck. Fold the two corners back one on each side of the head, in the form of triangles, and pin or tie.

(2) Similar square and placed as the one above. The free ends are twisted until the dressing is snug and then tied together under the chin.

(3) Likewise similar to the one above except that the two anterior corners are tied together and the two posterior corners are tied together.

Posterior Triangle of Shoulders (Fig. 98) (Handkerchief with Base 40 to 42 Inches Long).—Apply the centre of the

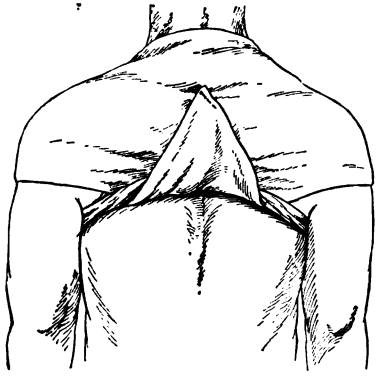


FIG. 98.—Posterior triangle of the shoulders.

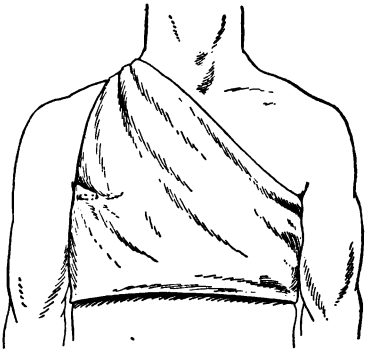


FIG. 99.—Thoracicoscapular triangle.

base back of the neck, allowing the apex to drop down between the shoulders. The ends are crossed over the chest and carried under the axillæ and fastened together over the apex which is turned up and pinned on itself.

The Thoracicoscapular Triangle (Fig. 99).—Place the base of a large triangle low down on the chest with apex thrown over the desired shoulder. Carry the extremities around the chest and fasten together over the apex which is turned up and pinned back upon itself. The excess of free edge on one side of the triangle is lapped and pinned.

By splitting the apex and carrying one over each shoulder

the bandage can be made to serve double duty. The slack on each can be taken up and pinned.

Thoracicohumeral Triangle (Fig. 100).—Place the centre of the base of the triangle around the affected arm, just above the elbow, apex pointing to the shoulder. Carry the extremities around the chest and tie. Draw the apex well up on the shoulder, tuck in on one side, fold down and pin front or back.

Triangle Suspensory of the Breasts (Fig. 101) (Single). —Place the base of a large triangle with its centre under the

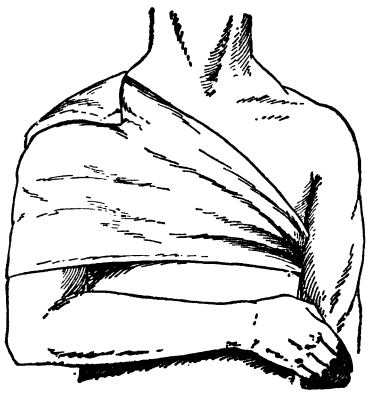


FIG. 100.—Thoracicohumeral triangle.

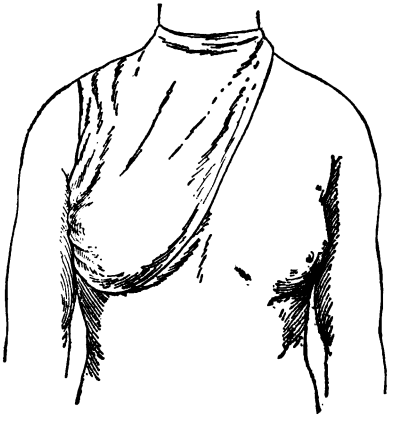


FIG. 101.—Triangle suspensory of the breast.

inner aspect of the affected breast, the apex passing up over the breast and shoulder and dropping posterior. Pass the two ends one under the corresponding axilla, the other over the opposite shoulder. Fasten together posteriorly over the apex which is turned back and pinned. (Fig. 102.) (Double.) Separate the layers of the apex and carry one over each shoulder and after lengthening by a strip of bandage fasten under the united extremities.

Brachiocervical Triangle (*a*) (Fig. 103).—With the arm held at the side, flex the forearm at right angles and place the base of a large triangle around the wrist with the apex

toward the elbow. Carry the anterior extremity around the opposite side and the posterior extremity around the corresponding side of the neck and fasten so as the knot is

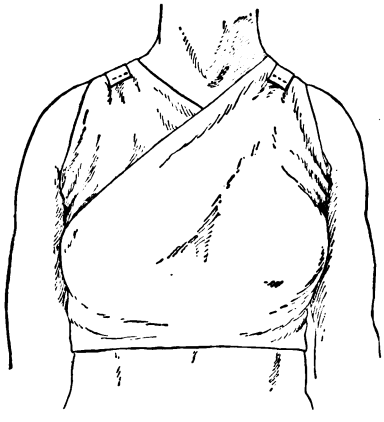


FIG. 102.—Triangle suspensory of both breasts.

FIG. 103.—Brachiocervical triangle or sling.

FIG. 104.—Brachiocervical triangle sling.

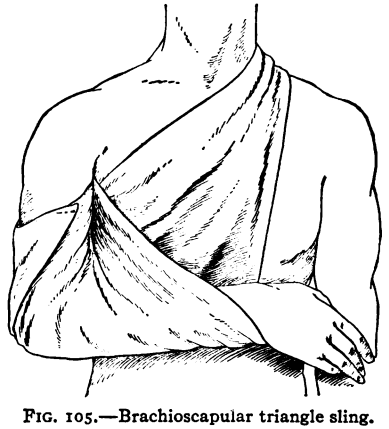


FIG. 105.—Brachioscapular triangle sling.

placed on one side of the neck. The apex is tucked under or brought forward and pinned around the arm.

Brachiocervical Triangle (*b*) (Fig. 104).—Flex the forearm into the acute position. Place the triangle between the

arm and the chest with the base passing diagonally across the axilla of the affected side and the apex hanging down over the chest. The upper extremity passes over the shoulder of the injured side. Bring the lower extremity around the outside of the arm and elbow and carry it over the sound shoulder to be tied to the upper extremity posteriorly. The apex is brought up around the forearm and pinned high up on the upper extremity.

Brachioscapular Triangle (*a*) (Fig. 105).—For suspension from the uninjured side, the posterior extremity is

FIG. 106.—Brachioscapular triangle sling.

FIG. 107.—Brachioscapular triangle sling.

carried over the uninjured shoulder, the anterior extremity placed under the axilla of the injured side and the two knotted together posteriorly. The apex is folded around the arm and pinned. Second method differs from the above only in that the posterior extremity is carried back of the chest.

Brachioscapular Triangle (*b*) (Fig. 106).—*First method:* For suspension from the injured side. The only change is in having the posterior extremity pass over the shoulder of the injured side. However, a further roller or cravat is usually needed to fasten the knotted ends to the neck to prevent its slipping from the shoulder.

Second method (*c*) (Fig. 107): Place the base of the

triangle around the trunk a little above the level of the flexed forearm, and tie posteriorly. The apex which has been dropped down anteriorly is looped up enclosing the forearm and lower arm and carried over the corresponding shoulder to be lengthened by a roller, if necessary, to meet the united extremities posteriorly.

Third method (*d*) (Fig. 108): Place the base of the triangle obliquely under the wrist and carry the posterior apex under the opposite axilla, the anterior being looped up over

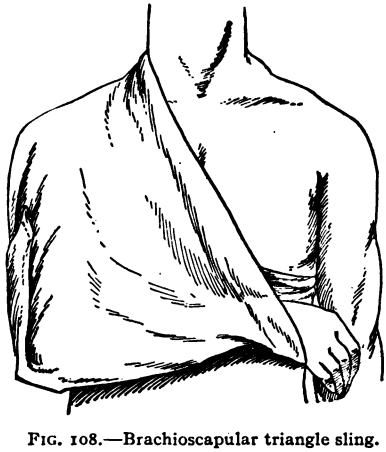


FIG. 108.—Brachioscapular triangle sling.

FIG. 109.—Mayor's bandage.

the forearm and elbow, then carried over the corresponding shoulder to be tied to its fellow posteriorly. Tuck the fulness of the bandage back of the arm and bring the apex forward to be pinned.

Mayor's Bandage (Fig. 109).—Flex the forearm at a right angle and bind the arm to the chest by tying the two extremities of the handkerchief triangle around the chest and arm just above the elbow, allowing the two folds of the apex to hang down in front. Carry both folds of the apex up behind the forearm, the under one passing over the sound shoulder and the upper one over the affected shoulder. Fasten

a piece of roller bandage to one apex, carry it down the back around the untied extremities and fold up to be fastened over the opposite shoulder to the other apex. This dressing constricts the wrist with the hand left hanging. It is better to retain the hand in the bandage.

Modification of Mayor's Bandage (Fig. 110).—Place the handkerchief triangle base on the chest and tie the extremities

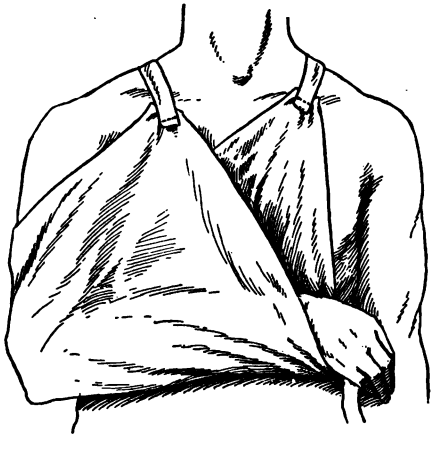


FIG. 110.—Modification of Mayor's bandage.

FIG. 111.—Shoulder triangle.

behind the back, the folds of the apex hanging down in front. Carry the top fold beneath the forearm and arm over the opposite shoulder. Carry the under fold over the forearm and arm and up over the other shoulder. Loop a piece of roller bandage under the united extremities and fasten an end to each apex fold.

Shoulder Triangle (Fig. 111).—Place the base of the triangle over the point of the shoulder letting the apex fall down the arm. Carry the extremities around the shoulder

under the axilla, cross and bring them around the arm, tie them over the apex back, and pin.

Hand Triangle (Fig. 112).—Place the base of the triangle on the palmar aspect of the wrist. Carry the apex under the palm around the finger ends and up to the dorsum of the wrist. Carry the two extremities around the wrist and hand, fold the apex, if long enough, back upon them and tie.

Anterior Pelvic Triangle (Fig. 113).—With the base of the triangle up and the apex hanging down in front, fasten the two extremities around the brim of the pelvis. Carry the

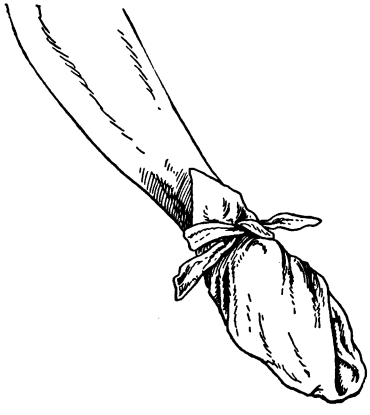


FIG. 112.—Hand triangle.

FIG. 113.—Anterior pelvic triangle.

apex over the genitalia through the perineum and up posteriorly to be attached to the united extremities.

Posterior Pelvic Triangle.—Similar to the above except it is applied posteriorly and fastened in front.

Scrotal Hammock (Figs. 114 and 115).—This dressing is made of flannel, 16 inches long and 8 inches wide, from the ends of which a V-shaped wedge is cut, 4 inches deep. Button-holes are cut in each corner. A belt of webbing or flannel, with a button sewed on it over each anterior superior spine, is fastened around the waist. Draw one edge of the

FIG. 114.—Scrotal hammock.

FIG. 115.—Scrotal hammock.

dressing up snugly back of the scrotum and button the two corners. Bring the other ends up, enveloping the scrotum, and button to the belt. A hole may be cut in the anterior fold for urination if so desired.

Scrotal Triangle.—Tie a cravat around the pelvis. Place a small triangle with its base at the perineoscrotal junction and carry one extremity up each side of the scrotum to pass under the cravat from above downward. Bring them around their own outer edge and tie. Bring the apex up over the genitalia around the cravat from below upward and pass it under the united extremities.

FIG. 116.—*a*, knee triangle; *b*, foot triangle.

Scrotal Square.—Tie one side of a square around the base of the genitalia. After twisting the other two corners two or three times, pass them around the tied corners from above downward and around their own outer edge to be tied in front.

Gluteal Triangle.—Place the base of the triangle with the apex up just below the fold of the buttock. Pass the extremities around the thigh and return to tie. Carry the apex up to be looped around a pelvic cravat.

Inguinal Triangle.—Similar to the gluteal triangle but placed over the groin.

Tibiocervical Sling.—Pass a long cravat over the shoulder of the sound side and knot it at the waist of the injured side. Loop a triangle around the leg, with the base toward the ankle, and tie the extremities through the cravat. Fold the apex around the knees and pin.

Knee Triangle (Fig. 116).—With the base above the patella and apex hanging down anteriorly, pass the extremities around the limb, cross, and return below the patella, tying them over the apex. Turn the apex up and pin it.

Foot Triangle (Fig. 116).—With the centre of the base of the triangle back of the ankle, the apex is carried under the sole, over the toes and instep to front of ankle. The extremities encircle the ankle, confining the apex beneath them.

Cravats.—The application of cravats is so very simple that it is not deemed necessary to explain in detail. The bandage is a very useful one to retain temporary dressings, in emergency or first aid work and sometimes as a temporary tourniquet. It is applied in the desired position, wrapped around the part, and the ends pinned or tied together. Its commonest use is as a wrist sling. The centre of the body of the cravat is looped under the wrist and the two ends carried one around each side of the neck and tied together, preferably in front. It is sometimes used to sling the lower extremity around the waist or neck.

When used as a tourniquet it is passed around the part between the heart and the wound, and its ends tied together so that the cravat is loose enough to allow of the introduction and the twisting of a lever in the shape of the hand, or a stick of some sort.

PART III

ELASTIC BANDAGES

There are three types of rubber bandages (Figs. 117 *a, b* and *c*): (1) Martin's bandage, (2) elastic webbing bandage, (3) Esmarch tourniquet, and (4) Unna's dressing.

Martin's Rubber Bandage.—This is a strip of rubber varying in width from 2 to 4 inches and in length from 3 to

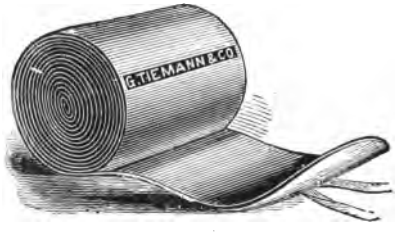


FIG. 117*a*.—Rubber bandage.

FIG. 117*b*.—Elastic fabric bandage.

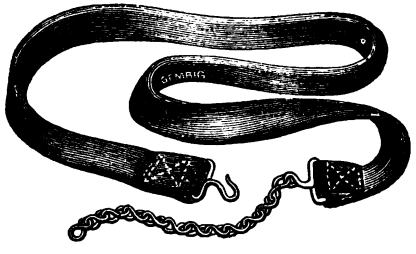


FIG. 117*c*.—Esmarch tourniquet.

5 yards. It has attached to one end two tapes by which the bandage is secured. In applying the bandage, no reverses are used and very little tension is applied. It is preferable to have a gauze or flannel bandage or stockinette next the skin to absorb the moisture. The dressing should be kept free from all ointments, oils, ether, etc., which are harmful to rubber.

It should be removed at least once in 24 hours to allow it to dry out. It is applied without reverses.

Elastic Webbing.—This is an improvement over, and has none of the disagreeable features of the Martin bandage. It is made of a rubber or elastic network covered with a fabric of cotton or silk. It is used in the same way as the Martin bandage, except that it demands no gauze or flannel next the skin. It possesses the distinct advantage of permitting evaporation of perspiration. No reverses are used in its application.

Esmarch Tube or Tourniquet.—This is a rubber strap about 1 to 1¼ inches wide, ⅛ inch thick and 5 to 6 feet long, with a hook on one end and a chain on the other. Its chief use is as a means of preventing hemorrhage from wounds in the extremities. It is not properly a bandage. When applied as a tourniquet, the part should be elevated for 10 minutes before application. With a turn or two of bandage beneath it, apply the tourniquet on a stretch until the pulse disappears below it. Have the turns overlap each other and hook the ends.

Elastic Fabric Bandage.—This elastic bandage is made entirely of cotton woven in a manner to allow stretching almost equal to that of rubber. It possesses all the advantages and qualities of a bandage interwoven with rubber, yet is lighter, more durable, permits evaporation, may be washed repeatedly, and has no odor. It is readily sterilized and can be kept indefinitely. In its application reverses are unnecessary.

Unna's Dressing.—This dressing is composed of layers of gauze bandage soaked with a paste (Unna) composed of gelatine, 15 parts; glycerin, 15 parts; zinc oxide, 30 parts; and water, 40 parts. This paste when cold has a gummy elasticity, but when heated over a water bath, it becomes liquid. *Application:* Heat the Unna paste over a water bath until it is

liquid but not hot enough to burn the skin. Paint it with a brush on the skin of the part to be dressed. Cover with a layer of gauze bandage. Repeated alternate layers of gauze and paste to the number of three or four complete the dressing. The dressing is allowed to dry out and is then covered with a dry gauze bandage, dusted with talc or varnished.

If desirable, fenestra may be cut in the dressing to permit of attention to underlying conditions.

The Unna dressing makes an excellent substitute for rubber bandages used as support to the lower leg, as in varicose conditions. It gives excellent support, is cheap, allows of care of ulceration through opening in it, may be left on from days to weeks in some cases and also seems to have some medicinal effect on the eczematous condition which so often exists. Drugs such as resorcin, boric acid and carbolic acid in small proportions are sometimes added.

PART IV

ADHESIVE DRESSINGS

ADHESIVE plaster dressings are used chiefly for support, fixation and compression in sprains, fractures and chronic exudative conditions in tendons, bursæ, etc.

Surgeon's Adhesive Plaster.—This is the original rubber adhesive of a deep yellow color, made with caoutchouc as a base. It is adhesive at all degrees of atmospheric temperature, retains its adhesiveness a long time and is not affected by moisture in the atmosphere. When necessary to keep it for a length of time it is best preserved in tin-foil, paper or box.

" ZO " Adhesive Plaster.—This plaster is an improvement over the surgeon's adhesive in that it is made from rubber from which the irritating substances have been removed. It is preferable to the surgeon's plaster because it is less irritating, neater and cleaner looking, and in addition is put up in sterile packets. Moreover, it never leaves its adhesive material on the skin as sometimes occurs with the surgeon's rubber plaster.

Janus Adhesive Plaster.—This plaster has one surface coated with " ZO " and the other with plain adhesive. It is sometimes used for fixing a dressing to the skin.

De La Cour's Adhesive Plaster.—The plaster is made of lead, resin, and wax and is most often designated by the term " resin plaster." The plaster has its surface protected with tissue paper. When cool the paper strips off readily, but adheres tightly when warm. Hence this adhesive plaster is usually kept near ice in warm weather. A very convenient manner of keeping a ready supply is to tear off the paper, cut the strips the desired lengths, and fold up in oiled paper.

The strips should always be cut, never torn. Before applying a strip, it must be heated. This may be done by laying it on the sterilizer or autoclave or by passing it over a flame, adhesive surface down, until the light yellow color of the backing changes to a deeper yellow. It is very important that the ends of the strips be well warmed (Fig. 118).

Various weight materials are used as backing for the adhesive, the heaviest being mole skin. This mole skin adhesive is used for the making of extension dressings, supportive belts, etc.

FIG. 118.—Heating adhesive plaster.

Isinglass Plaster.—This plaster is a gelatine adhesive plaster, spread on different weight backings. It is to-day manufactured under sterile precautions. It needs wetting before applying and if it is applied near an open wound it should be moistened with an antiseptic solution. Court-plaster is merely isinglass spread on various colored cloths.

General Considerations: "ZO" and rubber adhesive are applied at room temperature although a little warmth increases their adhesive qualities. When tearing the adhesive

roll into strips it is better to first separate the backing of webbing for half an inch or so across the entire width of the roll. In starting the webbing, be careful not to allow the extreme corner of the adhesive to fold upon its adhesive surface and adhere, causing the ends to curl up after application. Should this occur it is best to cut the end off rather than separate it. With a pair of scissors, make cuts along the freed edge, distant from each other the width of the strip desired, and tear down the required length. Never attempt to tear adhesive plaster across its width but always in the direction of its long threads.

Before attempting to apply adhesive the operator should remove his gloves and free his hands of powder or moisture. The part to be dressed must be shaved and freed from all soap and moisture by the application of alcohol, ether or benzine. In the application of the adhesive strips care must be taken that the skin is not folded or creased between the strips, as this causes discomfort and destruction of the epidermis resulting in ulceration. When convenient the adhesive dressing should be covered with a snug gauze bandage, which causes the adhesive to adhere more firmly, as well as giving additional support.

The manner of the removal of adhesive from the skin is very important. If it is to be removed dry, free the ends and draw it slowly back upon itself, gently pressing the skin down away from the adhesive surface (Fig. 119). This method causes little discomfort. Another dry and more rapid method is to free an end and then with a quick jerk remove the plaster. This sometimes carries the outer layer of the skin with it.

For removal with the help of solutions, ether, alcohol, benzine, gasoline and turpentine may be used. The best result is obtained, if end of adhesive strip is turned up and the solution applied to its under surface with cotton or gauze.

Adhesive once removed from the skin after being in place more than a few moments, can never be used again with any degree of satisfaction, since it fails to stick tightly. Resin plaster will adhere again if reheated.

When the adhesive is left on for some days, it causes a dermatitis which is characterized by the formation of pustules and an itching sensation. This is minimal under resin plaster or "ZO" perforated sheets. Delicate skin, especially that of an infant in warm weather, does not tolerate adhesive plaster for any length of time.

FIG. 119.—Removing adhesive strips.

Abdomen (Figs. 120 *a, b, c* and *d*).—Adhesive plaster, "ZO," on mole skin preferably, 7 inches wide and long enough to a little more than encircle the patient's waist. The plaster is folded lengthwise with ends meeting and cut in a curved line from lower corner of the fold to an inch of the upper corner of the two ends. This gives 3 pieces, 1, 2, 3. The patient should be in the dorsal position with the hips slightly elevated, when the plaster is applied. No. 1 piece is applied with its long straight side passing around the wrist

in a slightly upward direction, just catching the lower ribs. A V-shaped notch is cut to expose the umbilicus and the lower point is cut off to avoid adhesion with the pubic hair. The pieces 2 and 3 are applied over 1, one on each side with

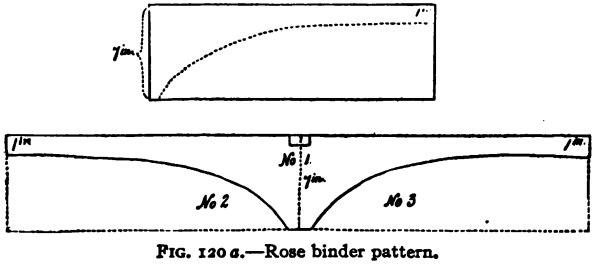


FIG. 120 *a*.—Rose binder pattern.

FIG. 120 *b*.—Rose binder being applied.

the curved edge looking upward and inward to adhere to the lower ribs. It is designated as "the Rose binder."

Umbilicus.—Indication, umbilical hernia, small and reducible. Prepare two strips of zinc oxide or resin adhesive plaster 1½ inches in width, one strip being long enough to encircle the abdomen two-thirds way, the other, two to

three inches long. Place an umbilical button, a coin or a circle of gauze, ¼ inch thick and of sufficient size to easily cover the umbilicus, on the centre of the long strip. Place the centre of the short strip over this, with its adhesive surface facing the adhesive surface of the long piece. With the abdomen relaxed, accomplished best by elevation of pelvis, with the hernia reduced apply the button over the orifice.

FIG. 120 *c*.—Rose binder (posterior view).

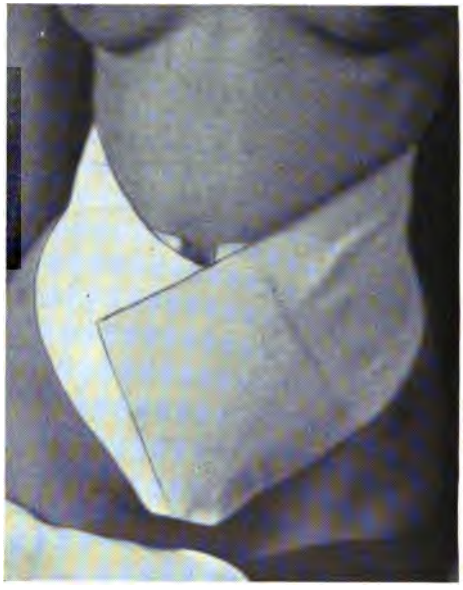


FIG. 120 *d*.—Rose binder (anterior view).

Draw the abdominal skin forward and carry the ends of the strap backward and slightly upward, applying them snugly.

Shoulder (Sayre Dressing).—Prepare two strips of adhesive plaster two or three inches wide, long enough to encompass the chest one and a half times. A collar of gauze or line a shade wider than the adhesive strip is placed around the arm of the affected side. Looping one end of one of the

strips around the collar, with the adhesive side toward the chest, drawing the arm backward, the other end is carried straight across the back and around the chest. Draw the elbow forward and place the hand of the affected side on the opposite shoulder. Having cut a hole in the centre of the second strip for the elbow, place this hole over the elbow. Then standing on the opposite side of the patient,

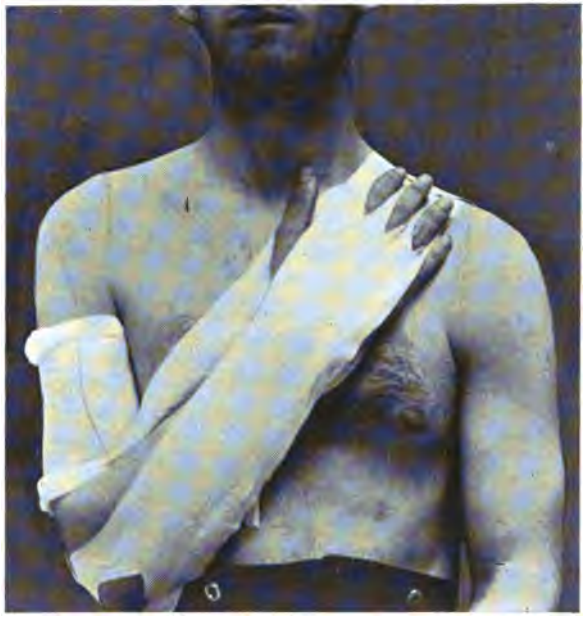


FIG. 121.—Sayre dressing modified.

draw the two extremities taut in the line of the forearm. Carry the posterior extremity diagonally across the back and around the opposite shoulder, the anterior strip up the forearm and over opposite shoulder. This, the original Sayre dressing, has the disadvantages of a low placed imprisoned hand, which becomes very uncomfortable due to pressure on the knuckles and fingers.

Sayre Modified (Fig. 121).—Dressings, the same as the

Sayre except the anterior strap passing from the affected elbow to the opposite shoulder has slits cut to enable the fingers to come through. A small gauze pad is placed on the dorsum of the hand and two or three thicknesses of gauze between the forearm and chest. With the hand of the affected side placed well up over the opposite clavicle the adhesive strap is applied as seen in Fig. 121.

FIG. 122.—Acromioclavicular support.

Acromioclavicular Joint (Fig. 122).—Cut an adhesive strip two inches wide and five feet long. Fashion a pad of 14 to 16 thicknesses of gauze 2 inches square with a hole cut in its centre. With the arm of the affected shoulder beside the chest and the forearm flexed at right angles, loop the centre of the adhesive strip under the elbow about 1 inch from the tip. Place the pad over the outer end of the collar bone and while an assistant presses down on the pad and up on the elbow, cross the two ends of the adhesive over the pad,

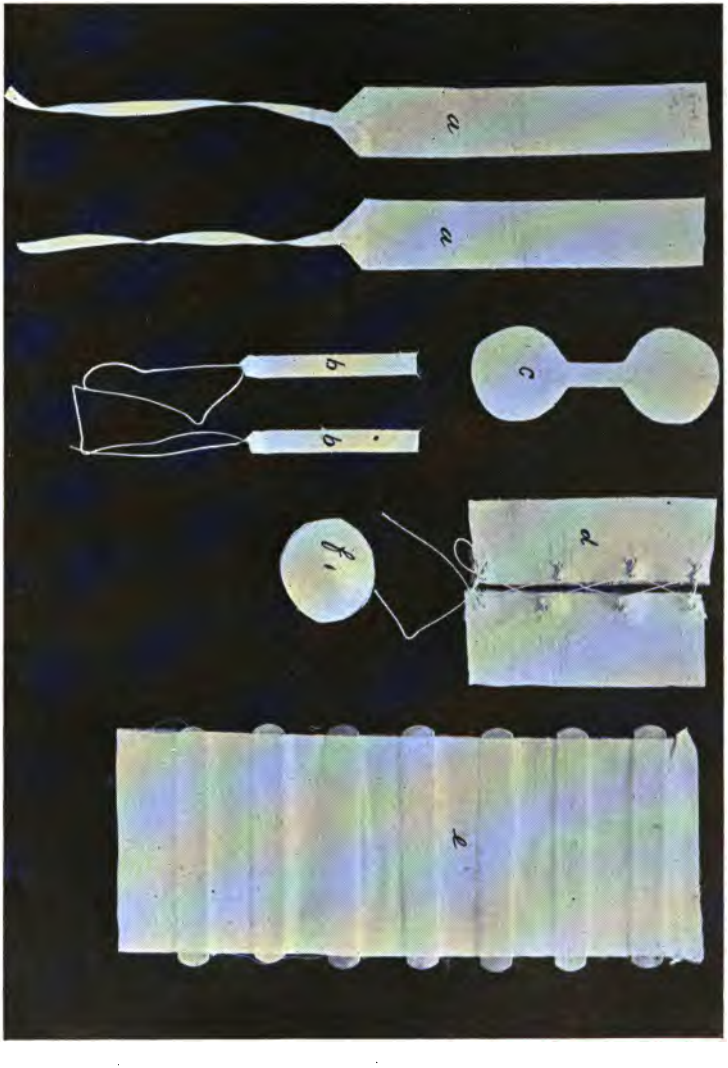


FIG. 123.—*a*, taped adhesive; *b*, catheter straps; *c*, dumb-bell adhesive; *d*, laced adhesive; *e*, Gooch splint; *f*, furuncle cone.

carrying one end down across the chest and the other end down across the back. Apply a cravat sling at the wrist. The dressing is used chiefly in dislocation of the outer end of the collar bone or clavicle.

Taped Adhesive (Montgomery Strap) (Fig. 123, *a*).—Although two or more straps are employed, being all alike, the description of one will suffice. A strip of adhesive the desired length and width, depending on its use, has attached to one end a narrow tape from 3 to 6 inches long. The tape can be attached by stitching or by passing it through a hole near the end of the adhesive and knotting before folding over the adhesive, as seen in illustration. The last two inches of the tape end has its adhesive surface covered by an adhesive strip applied with the fabric side out. This prevents adhering to the dressings. These straps are useful to retain dressings that need frequent changing. They are applied in pairs opposite each other and tapes tied over the dressing. To change the dressing, untie the tapes and turn back on either side.

Catheter Straps (Fig. 123, *b*).—This type strap is made as the above, differing only in having the tape replaced by heavy silk thread. The adhesive straps are cut ½ inch wide and 2½ inches long. Two to four are usually employed. Place longitudinally along the shaft of the penis and hold in place by a spiral bandage.

Dumb-bell Adhesive Strap (Fig. 123, *c*).—With the webbing loosened at one extremity fold the adhesive plaster back upon itself. Cut out in the shape of one end of a dumb-bell, the centre of the bar corresponding to the folded edge of the plaster. When unfolded this forms a symmetrical dumb-bell or double-bladed canoe paddle dressing. Strip off the webbing and apply as desired. Its common use is as a tension strap for repaired hair lips and other wounds whose edges are inclined to separate.

Laced Adhesive (Fig. 123, *d*).—To one edge of two adhesive strips the desired length and width, are sewed small

dress hooks, opposite each other. The two straps are applied one on each side of the wound, with the hooks next the wound, and laced together with a silk thread.

Splints (Fig. 123, *e*).—Adhesive plaster is often used to splint a broken finger by binding the injured member to the neighboring finger, or by reduplicated strips. Coaptation

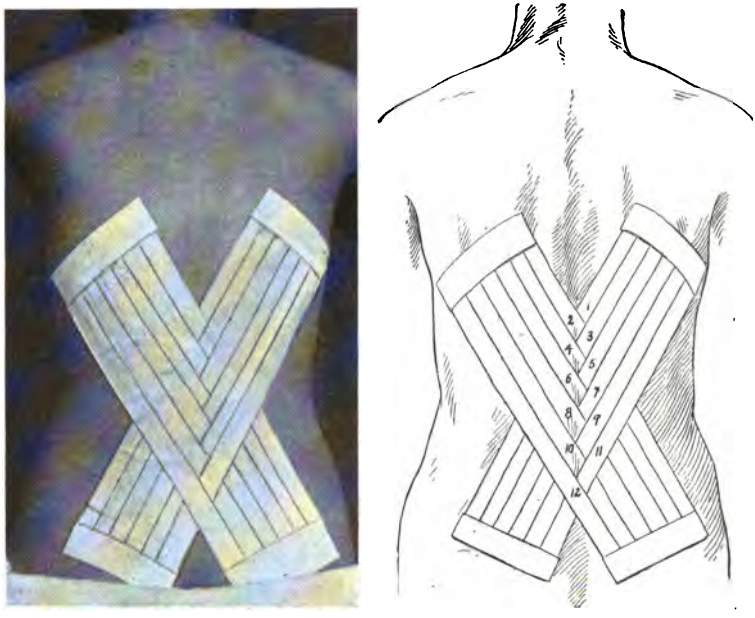


FIG. 124.—Back strapping.

splints are frequently united in series by placing them parallel between two sheets or wide strips of adhesive, thus forming a Gooch splint (see figure).

Furuncle Cone (Fig. 123, *f*).—Cut a circle of adhesive the desired size. Make an incision from the circumference to its centre and overlapping make a dart. If desired the apex of the cone may be cut off to permit evaporation.

Back (Fig. 124).—Fifteen or twenty "ZO" adhesive strips 1 inch wide and from 10 to 12 inches long are re-

quired. Apply the first strip reaching from just below the angle of the shoulder-blade on one side to the posterior superior spine of the iliac bone of the opposite side. Cross this strip with a similar one passing from the other shoulder-blade to the opposite posterior iliac spine. Apply these strips alternately, crossing them in the midline of the back and proceeding down the back, each strip overlapping one-half

FIG. 125.—Buck's extension.

the width of the corresponding one immediately preceding.

Stirrup Extension Strap (Buck's Extension) (Fig. 125). —Fold a long piece of mole skin adhesive upon itself for the desired length of the extension. For example, it should measure 6 or 8 inches longer than the distance from its highest point of application to the foot, in case of a lower extremity dressing. With the loop edge the centre of the handle, cut the doubled material in the shape of one end of a double-bladed canoe paddle, the blade being lengthened

toward the handle. The blades should be a little less than one-half the circumference of the part it is to cover and the handle should be 2½ to 3 inches wide. Cut a small hole in the centre of the handle and place over the hole the centre of the stirrup or spreader, a piece of wood, the width of the strap, a little longer than width of part where the adhesive leaves it, and ¼ inch thick. Cover exposed sides of spreader and for 6 to 8 inches out on adhesive side of strap with a

FIG. 126.—Ankle strapping.

strip of adhesive of same width and with hole in centre. A stout cord passes through the superimposed holes.

Ankle (Fig. 126).—Take about 10 strips of "ZO," 10 inches long and ½ to ¾ inch wide, and 10 strips of the same width, but from 14 inches to 16 inches long, shave off any hair that may be present. Place the foot at right angles to the leg. A long strip is applied with the centre over the back part of the sole of the heel and the two ends carried up one on each side of the Achilles tendon, putting the most

tension on the end corresponding to the side of the strained ligament. A short strip is next applied to the posterior aspect of the heel as low down as possible and each end is applied on one side of the foot as near the plantar surface as possible. The strapping is continued by alternating first a long strip up the leg, then a shorter strip down the foot. Each strip overlaps about one-half the width of the previous one. The leg strips approach the front of the leg and the foot strips ascend the foot. Extending up the middle of the dorsum of the foot and ankle there should be a space at least three-quarters of an inch wide left free of plaster, in order to obviate any possibility of interference with the circulation. Occasionally a few circular strips are applied around the instep for additional support. Cover the entire dressing with a few turns of gauze bandage to retain it for a few hours until the plaster adheres.

Another method of strapping the ankle is by using six or eight pieces of adhesive 1 inch wide and 18 inches long. To fix the internal ligament, start the first piece on the dorsum of the foot; pass outward around the outer edge, beneath the instep, up the inner side diagonally, and up the ankle anteriorly, crossing to the outer side of the calf. Apply all the strips in the same manner, each overlapping about one-half the previous one. To splint the external ligament, reverse the direction of the strips, starting on the outer side of the foot then around under the instep and up the inner side of the leg. These dressings are used very often as supportive measures in the treatment of sprains of the ankle and tarsus.

Chest (Fig. 127).—For fractured ribs have six or eight adhesive "ZO" strips, 3 inches wide and long enough to reach from the spine to the sternum. Have the patient stand or lie with the affected side toward the surgeon and with the hand of the same side on his head. The other shoulder should be against the wall or something solid, if patient is in standing position. Apply the end of the strip firmly at the spinal

column at least 3 or 4 inches above the site of the injury. The patient is told to empty the lungs and as he does so, the plaster strip is drawn forcibly downward and forward and smoothly applied to the chest, in a nearly horizontal direction. Each strip is applied in this manner, overlapping one-half

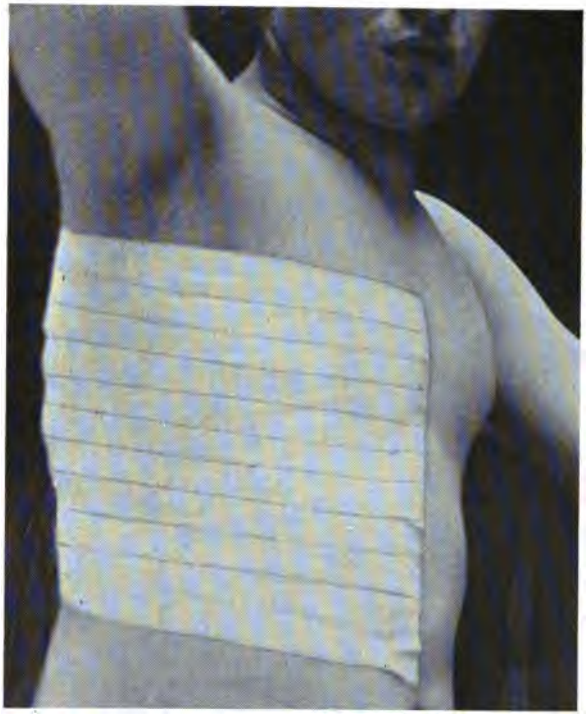


FIG. 127.—Chest strapping.

the previous one. The dressing should extend, if possible, 3 inches or 4 inches above and below the injured rib or ribs. It is claimed by some that it is better to apply the strips below first, overlapping from below upward. The dressing properly applied will make the patient comfortable, relieving him of the knife-like pain on respiration. If this is not accomplished the dressing must be applied tighter. For pleurisy the dress-

ing should cover as much of the side as possible. In case of the upper ribs being broken, and in women, better fixation is obtained by passing a strip 3 inches to 4 inches wide entirely around the chest, above the breasts.

Should additional rigidity and fixation be desired, successive layers of strips may be applied crossing each other in different directions.

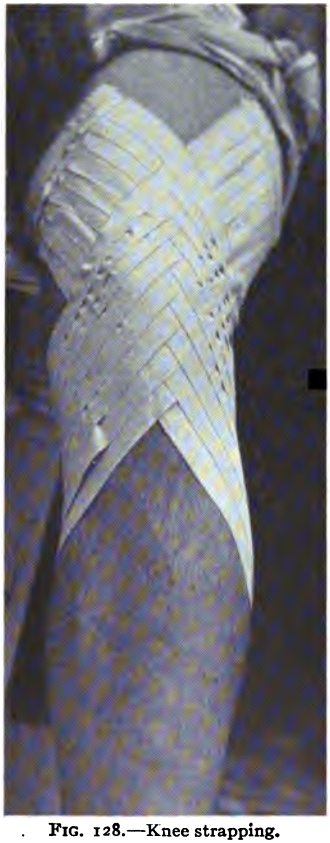


FIG. 128.—Knee strapping.

Knee (Fig. 128).—Have prepared 15 to 30 strips, ¾ inch wide and 12 inches to 14 inches long. The leg is extended on the thigh and the hair shaved. A strip is applied with one end on the outer side of the thigh 6 inches to 7 inches above the joint, and carried diagonally down across the knee below the joint line, and on the inner aspect of the leg. The second strip is started on the inner aspect of the thigh, 6 inches or 7 inches above the joint, and then carried diagonally down and across the joint, crossing the last strip in the midline below the patella and then passing on down on the outer aspect of the leg. The remaining strips are applied alternately on each side, and overlapping one-half the width as they ascend the limb.

Leg.—Adhesive strips, ½ inch wide and long enough to three-quarters encircle the leg, are torn. Number varies with desired size of dressing. Apply strips as described in strapping knee. The dressing is used for varicose leg ulcers.

Inguinal Dressing (Fig. 129).—This is made of a piece of flannel 6 inches wide and 16 inches long to each end of which is sewed a strip of adhesive plaster 16 inches long. The flannel part surrounds the leg, the adhesive pieces cross over the inguinal region, and adhere to the flanks.

Achilles Tendon (Fig. 130).—The foot is put at right angles to the leg or in position of a slight toe point. An adhesive strap 18 inches long and 2 inches wide is split at one

FIG. 129.—Inguinal dressing.

end for two-thirds of its length. The uncut portion of the plaster is applied to the sole of the foot, the angle of the slit reaching the point of the heel. The outer strip is now crossed over the tendon diagonally to the inner side and carried up the calf. The inner strip is crossed over the tendon diagonally to the outer side and carried up the outer side of the calf. A circular strip may be placed around the extremities of the strips above and below. The dressing is

often better made with several strips of the above length and ½ inch wide applied in much the same manner, except that they are started under the instep, passed up beside the heel and across the tendon up the calf. The dressing is employed for strains of the tendon, tenosynovitis, and rupture of the tendon or muscle.

FIG. 130.—Achilles tendon strapping.

The Testicles.—First remove the hair from the part of the scrotum to receive the adhesive. Then cut 15 to 20 adhesive strips 5 inches long and ¼ inch wide. The affected testicle is pushed down into the scrotum, the scrotum drawn tense over it by encircling the top of the testicle with forefinger and thumb. This accomplished, apply adhesive strip around the upper part of the testicle. Now pass the other strips around the testicle in the direction of its long axis, beginning and ending on the circular strip and overlapping a third of the previous strips. When covered by a layer in this direction, pass another layer at right angles to the first.

Adhesive Suspensory.—A strip of adhesive 5 inches wide and 12 inches long is split down the middle for two-thirds its length. The penis and scrotum are pulled up on the abdomen and the broad end of the adhesive applied firmly across the perineoscrotal junction. The split in the plaster is lengthened down

to the penoscrotal junction. The penis is drawn into the apex and the two ends fastened to the abdomen.

Pelvic Binder (Fig. 131).—Cut adhesive strip 3½ inches to 4 inches in width and long enough to pass one and a half times around the hips. Face the centre third of the strip with a similar though shorter strip, so that the adhesive surfaces are together. With the patient lying on his abdomen or standing, pass the binder across the lower abdomen between the crests of the iliac bones. After placing a small "bunion plaster" pad around each anterior spine of the

FIG. 131.—Pelvic binder.

pelvis, draw the two ends of the binder taut, crossing them over the sacrum and carrying each toward the opposite trochanter.

Sometimes, in patients with pendulous abdomens, this long strap binder is not feasible as it is rolled up by the abdomen pressing down on it. In such cases, several strips 2 inches to 3 inches wide and reaching from anterior superior spine across the back to opposite anterior superior spine are applied crossing each other in the centre in a diagonal direction toward the opposite trochanter.

PART V

PLASTER-OF-PARIS OR GYPSUM BANDAGES

General Considerations.—Plaster dressings are used for fixation of parts, over an extended period of time. Less common fixation dressings are silicate of soda and starch dressing. The material used for the bandage is unwashed crinoline. This is cut in strips the desired width and the mesh filled with fresh plaster of Paris, dry and free from lumps.

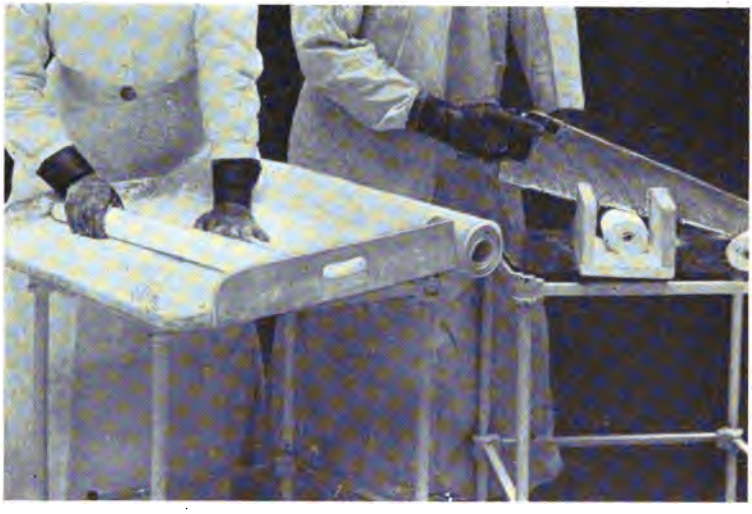


FIG. 132.—Making plaster bandages.

A much quicker way is to spread the entire width of the crinoline with the plaster, and, after rolling it, cut it the desired lengths by the use of a saw and mitre box (Fig. 132). The plaster, if exposed to damp air, will become air slaked and then the cast will crumble apart. To avoid this bake in an oven all plaster that has been in stock for some time. Spread the plaster on the unrolled bandage after which the bandage

is rolled loosely and if to be kept for any length of time is stored in air-tight receptacles.

Plaster bandages can be bought already prepared, and put up in air-tight receptacles. Most such bandages are rolled too tightly, to wet through easily, and are made of gauze which is not as good as crinoline.

As a broad, general principal, a plaster cast should extend beyond the joint on each side of the fracture. They are applicable for practically every fracture except those of the head, clavicle, ribs and of the femur in infancy. A newly applied cast should be viewed in a few hours. If this is impossible the cast should always be split while yet damp. Always advise the patient to report if there is any undue swelling, coldness, discoloration, numbness, tingling or throbbing, any one of which may indicate that the dressing is too tight. A properly applied cast should be comfortable. Any continued complaint on the part of the patient should demand careful examination or even the removal of the cast.

Application of a Plaster Cast.—The part to be dressed should be shaved and washed and then covered with flannel bandages, cotton, tricot hose, or sheet wadding, torn in bandage strips and applied in the manner of a bandage, also all bony prominences should be well padded with some soft material (preferably non-absorbent cotton) to prevent pressure points. Have ready a gown for the doctor and protection for the bed and floor. Have a basin or bowl with sufficient warm water in it to completely cover the plaster bandage when set on end in the bowl. A bowl of loose, dry plaster, some table salt, and some vaseline or petrolatum should also be handy. A pinch of the salt dissolved in the water will hasten the hardening or setting of the plaster. The vaseline may be rubbed into the operator's hands in the absence of gloves to prevent the plaster sticking to them or on the patient's skin for the same reason. The plaster rollers are

immersed one at a time in the warm water as needed and allowed to remain standing on end until the air bubbles have ceased to rise from the roller. The bandage must not be submerged until the operator is nearly ready for it, for if allowed to remain in the water too long the plaster sets and becomes hard, and is rendered useless. On removing the roller from the water both ends should be grasped (Fig. 133)

FIG. 133.—Method of squeezing water from bandage.

and the excess water squeezed out by a twisting motion. To obviate loss of plaster in submerging, each bandage may be wrapped in filter paper or Japanese paper napkins. With wrapper still on, the bandage is removed from the water and squeezed. The water escapes but not the plaster. The part to be bandaged is held by an assistant, two, if necessary, in the exact position ultimately desired. In applying the plaster bandage the principles of an ordinary bandage are used, with few exceptions. The plaster bandage is never pulled taut;

nor reverses used in the first layer or two, for as the bandage does not slip, the change in direction is accomplished by the folding of a dart in the inferior edge, and then using short figure-of-8 turns. The turns should overlap about one-half the previous turns and the loose borders in any turn are smoothed back with the thumb and finger as " darts " which readily adhere and stay in place. An excellent finish can be given the dressing by turning back cuff-like fashion, the ends of the flannel bandage, wadding, or tricot used, and holding it in place by the final turns of the plaster bandage, catching the free edge. While the cast is still pliable it may be molded to fit the contour of the part. This is a dangerous procedure except in skilled hands as pressure points are likely to be produced.

The discarded plaster in the basin should not be poured down the waste, as it will harden and close the drain pipe.

In order to reinforce a cast, use is made of strips of box-wood, card-board, gutta percha, tin and zinc, bent to fit the part, and covered in by the plaster bandage (Fig. 145, *a*). At times the reinforcement is made by simply reduplicating several turns of the bandage of a recurrent nature, each applied on the preceding ones and smoothed down. To give additional support and strength, a cream of plaster (gypsum), made by mixing the plaster with water, is applied by the hands in a thin layer between the succeeding turns. The plaster cream is mixed as follows: The desired amount of cold water is placed in a basin and dry plaster powder is dusted by hand into the water until the solution is saturated, which is indicated by the plaster floating on the water. When this point is reached stir with the hand until the plaster has a creamy consistency. A strong objection to the use of this cream between the layers, is the increased weight added to the cast, and at the same time rendering it more brittle. Finally, the completed cast is covered with this gypsum cream, which

is smoothed off with a wet cloth. This when dried gives a gloss that is especially desirable in cases where urine is liable to come in contact with the cast. A coating or varnish may be applied, after the cast has thoroughly dried. Great care must be exercised during the application and afterward, until setting has occurred, that the limb is held in the one position desired, and that the cast is not indented by fingers or other pressure. After 10 to 20 minutes when the cast has begun to harden, the limb may be rested on a soft pillow for its full length. Free access of the air to the plaster is necessary, as it takes from 20 to 24 hours to dry out thoroughly. When a hot air apparatus is at hand the cast may be baked for half an hour. Immediately after the completion of the bandage, the circulation of the part distal to the bandage should be examined, a part being left exposed for this purpose. Should the cast be too tight as shown by discolored, cold, numb or tingling extremities, it should be cut through longitudinally, while still moist, and any underlying constricting band of wadding or bandage cut through. Follow this with elevation of the part, and it will seldom be necessary to remove the entire cast.

Method of Removing a Plaster Cast.—While the cast is yet moist a groove is cut with a sharp knife, longitudinally, to within an inch of each end. The sensation readily imparted to the hand when the knife cuts through upon the flannel bandage or wadding, tells one when the cast is divided. A Gigli or chain saw may be placed, Fig. 134, at the time of application, under the plaster bandage in the desired position and later the plaster cut by a sawing motion and the sides pulled apart as in Fig. 135. An additional safeguard against possible injury to the underlying parts is the application of a zinc strip, or an oiled rubber tubing placed under the plaster bandage, in the line of incision, its ends protruding to indicate where to cut. A similar line of incision on the

FIG. 134.—Instruments for removal of plaster casts. *A*, Henry's knife; *B*, Bergman's saw; *C*, Reed's cutter; *D*, bandage scissors; *E*, Hopkin's shears; *F*, Sentin's shears; *G*, Gigli saw.

opposite side of the cast will enable one to remove it in two longitudinal sections. Should it be desired to cut the cast after it is hardened, mark the line of the intended cut with the knife, then apply a few drops of water, vinegar, acetic acid or dilute hydrochloric acid along the groove and proceed to cut through the cast, using more fluid from time to time to facilitate the cutting. If a furrow is cut from a cast it can

FIG. 135.—Removal of cast.

be readily sprung off and on again if desired. In removing a cast always cut through the under dressing and remove it with the cast, as it always adheres to the plaster. When a cast is reapplied its edges may be held together with a bandage or adhesive straps.

Fenestration of Casts (Fig. 136).—This is to permit the dressing of the wounds without necessitating removal of the

cast. The site of the wound should be accurately determined by measurement before the part is bandaged. The gauze dressing over the wound should be the size and shape of the desired fenestra or window. After marking out on the still damp plaster the outlines of the opening, the window is cut out with a sharp knife, just as in removing a cast. The rough edges of the cast are covered with radiating strips of adhesive, shellac, gutta percha tissue, or oiled silk. A second method of fenestration is to place a pill box top, a glass, or graduate over the wound and carry the turns of the plaster around

FIG. 136.—Fenestration of cast.

this. A third method is to cut two pieces of blotting paper the size and shape of the desired opening, pass a pin through the centre of one and place over the wound, allowing the pin to stick up. Apply the plaster around the pin, then when ready to cut out the window, place the second piece of blotter with the pin through its centre, and cut out around it.

Ambulatory Casts.—This manner of fracture dressing is applicable to fracture of the leg and ankle where there is no need for extension, or, when the patient must be around even though unable to use two crutches, because of disability of one arm. The upper limit of the cast should be above the knee, for fractures above the middle of the leg, and only up

to the tibial tuberosities in lower fractures. The cast must be especially heavy at the knee and ankle and the sole of the foot, to prevent cracking from weight. It transfers the weight from the tuberosities of the tibia to the ground or floor. Between the sole of the feet and the cast a thick pad of cotton is interposed to give cushion support to the foot. Thick padding is necessary also around and under the tibial tuberosities. This dressing is sometimes used in cases of delayed union, the theory being that the slight motion at the site of fracture will stimulate callus formation.

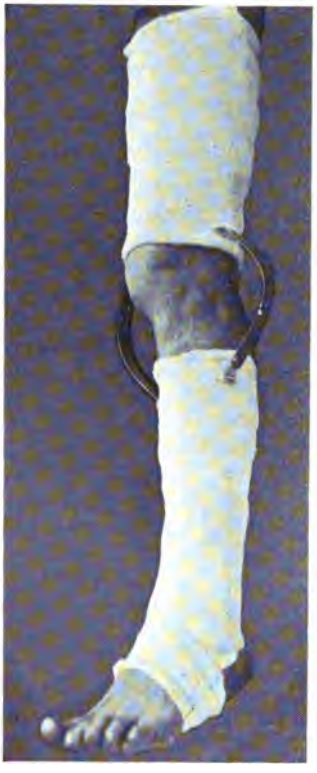


FIG. 137.—Segmented or bracketed cast.

Segmented or Bracket Casts (Fig. 137).—When it is desired to have access to wounds of joints or wounds extending around a large part of the circumference of the extremity, the part is bridged over by bands of metal, the extremities of which are incorporated in the segments of plaster above and below. Sufficient curvation is given the strips to allow for the desired ministrations to the parts.

Plaster Splints.—These may be made from plaster bandages, folded repeatedly one on the other, and applied still wet and molded to the part. Cut from lint, patterns of the splint you desire, care being taken that the lint is cut so that when applied on each side of the limb the soft side is next the skin. Make the pattern slightly larger than you wish the

splint. The pattern can be made more accurately by taking measurements of one-half the circumference of the limb, at various known levels, as, for example, at the knee and ankle, in leg splints. Lay the lint, soft side down, on a table and then apply repeated layers of plaster bandage and wet plaster until the desired thickness is obtained (Fig. 138). Usually 6 or 8 layers are sufficient. Rather than make the body of the splint with layers of gauze or crinoline bandage, one may use two or three layers of lint cut to fit pattern and impregnated with the plaster cream. These are laid upon the

FIG. 138.—Making plaster-of-Paris splint.

corresponding patterns and the splints are completed (Fig. 139). The splint is now applied to the part, the plaster side out, and bound snugly in place with a gauze bandage (Fig. 140). A second splint, made in similar manner, is applied to the opposite side and bound in position with a gauze bandage. At these places where the splint must be molded to sudden change in shape or diameter, a dart is made, after first cutting in the splint edge for one to two inches. In most cases two splints are desirable (Fig. 141). Each should be broad enough to encircle nearly one-half the limb. They are especially applicable for the leg and forearm and are held in place by a circular plaster strip, by adhesive straps or by roller bandage. Plaster splints thus used have many advantages over the older circular "cast." A nurse can be

making it while the doctor is busy at other parts of the dressing. It is very convenient for removal (Fig. 142) and inspection of the parts without disturbing the position, as one or the other splint may be lifted. By having only one

FIG. 139.—Making a plaster splint of flannel.

of the splints take in one joint and the other take in the other joint on each side of the fracture, by alternate removal, the freed joint can be given massage and passive movement.

Barvarian Splint.—Suspend the limb in a sufficiently large

piece of lint or flannel. Stitch the sides together down the front of the leg and around under the foot. Now apply a casing of plaster cream at least ¼ inch thick. Over this apply a flannel layer. When dry, trim off excess, cut stitches

FIG. 140.—Plaster splint.
FIG. 141.—Moulding and binding in position.

and turn back, protecting the edge with leather or adhesive. The dressing is retained by bandage, straps or laces.

Plaster Jacket (Figs. 143 and 144).—This dressing is to be applied to the trunk or neck, when fixation and extension

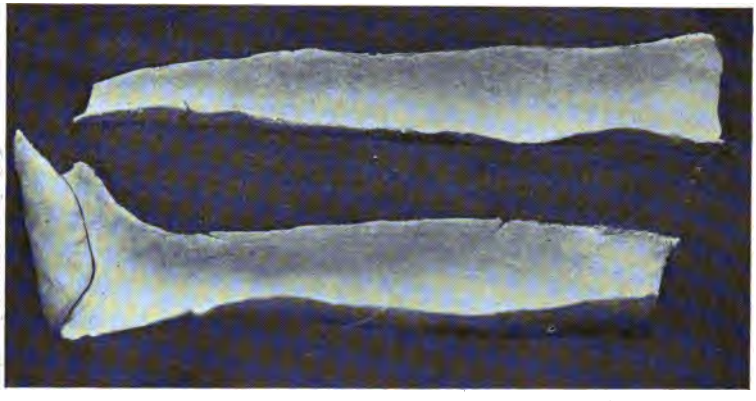


FIG. 142.—Plaster splints removed.

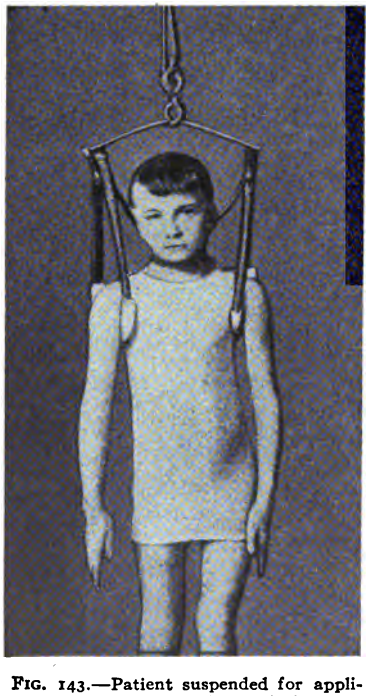


FIG. 143.—Patient suspended for application of plaster-of-Paris jacket.

FIG. 144.—Plaster jacket.

are desired. The patient is partially suspended from the ceiling, or tripod, with straps under occiput and chin and one under each axilla, or placed prone on a Bradford frame. A cylinder of stockinette or tricot, twice as long as the desired cast, is placed over the part to be jacketed, and holes cut out for the arms. A strip of gauze bandage is placed between this and the skin to be used as a scratching string. A pad of gauze or a folded towel ½ inch thick and 4 inches square is placed on the lower abdomen as a dinner pad. Bony prominences are well padded, and the plaster bandages, 3 inches to 6 inches wide are applied, in ascending and descending spirals, well up under the arms, or around the neck, in cervical cases and well down over the pelvis. Additional turns may be made over the shoulders and figure-of-8 turns under the axilla. After the plaster has "set" and is still wet, the margins are trimmed out, above and below, and the stockinette extremities pulled back, as a cuff on each end, and sewed together thus enveloping the cast outside and inside. To lighten the cast portions of it may be cut out of the anterior surface. Remove the dinner pad. This dressing is used for conditions of the vertebræ demanding fixation and extension, such as tuberculous disease, severe sprains and dislocations.

Plaster Spica of the Lower Extremity (Figs. 145 and 146).—For the application of plaster cast to the pelvis and thigh use may be made of the hip rest or, better, the Martin-Eliason sling. In the absence of hip rest or sling the superimposed fists may be used as a support. The parts to be enveloped in plaster are covered with tricot hose, or sheet wadding, with abundant padding over the sacrum and anterior superior spines and a dinner pad placed on the lower abdomen. Pad the back of the knee well and place a strip of wadding down each side of the crest of the shin. Place the canvas slings under the patient, one under the head, another under the shoulder, the third under the pelvis and the

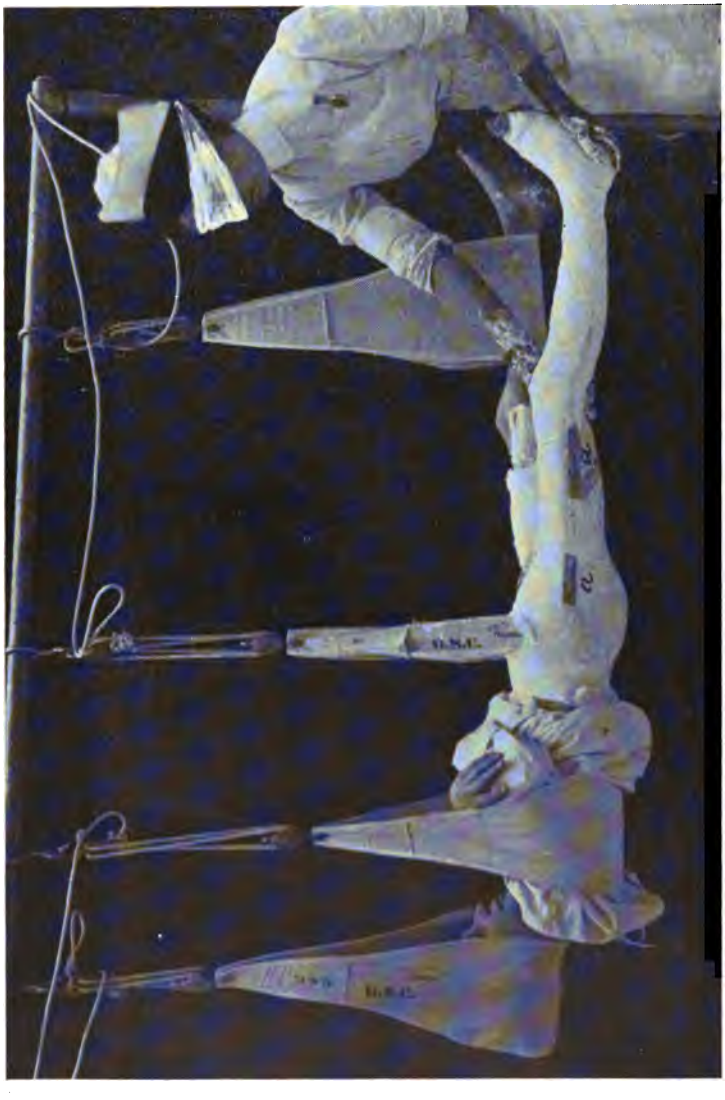


FIG. 145.—Showing the application of a plaster spica of the groin. Using the Martin-Eliason sling.

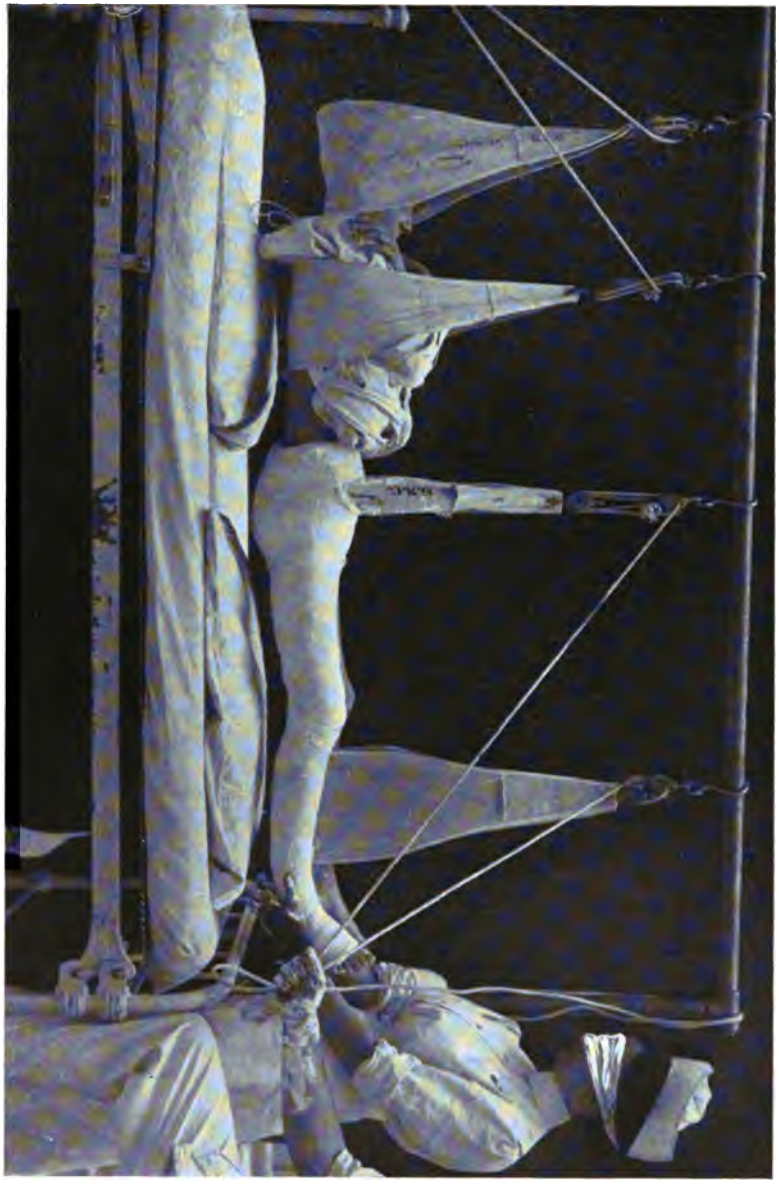


FIG. 146.—Cast completed and the patient is being placed in bed.

fourth to hold the unaffected lower limb. Slide the frame over the bed. After attaching the slings to their respective pulleys, the patient is raised from the bed. Remove the bed and apply the cast, by making spica turns around hips and thigh, incorporating reinforcing strips across the groin.

In cases of fracture in the upper third of the femur it is

FIG. 147.—Plaster shoulder cap.

best to encase the thorax up to the arm pits, both thighs and the injured leg as far as the ankle, placing the limb in the desired position. The pelvic sling remains in the cast.

Plaster Shoulder Cap (Fig 147).—With the arm held at the patient's side and a triangle pad between it and the chest, envelop the whole with flannel bandage and apply several layers of plaster bandages passing around the chest and arm

and over the shoulder well in toward the base of the neck. The lowest turns should pass around just above the bend of the elbow. Sling the arm at the wrist.

Although this is the most rigid cap it is sometimes irksome because of the chest constriction. If such is the case make the cap to come only to the midline of the body front and back and incorporate in it bandage strips or webbing straps, as shown in Fig. 147.

Sodium Silicate (Liquid Glass).—Sodium silicate in aqueous solution is often used in making a fixation dressing. Prepare the solution by evaporating 25 per cent. and adding gelatine, a drachm to the pound. Cover the part to be dressed with a single layer of gauze bandage and paint the silicate directly on it with a brush. Then apply successive layers of bandage and silicate until the desired thickness is obtained. Usually 4 or 5 thicknesses are sufficient. It is not necessary to apply any padding beneath the dressing, although it may be used if the skin is hairy.

A casing made with silicate has many advantages over plaster. It is less trouble to apply it, is lighter, more compact and, weight for weight, is very much stronger and more rigid. It is especially useful for splinting toes, fingers and arms.

Its one disadvantage is the length of time it requires to dry. This period is shortened considerably by the addition of gelatine, or mastiche added in small quantities. Stability, until the dressing hardens, is lent by the incorporation of strips of card-board.

This dressing is readily removed by cutting with bandage scissors or by using warm water, as silicate is readily soluble in water, but not in alcohol or ether.

Starch Bandage.—Make a cold starch solution of a creamy consistency. Heat this until it becomes a clear, sticky fluid. Dress the part to be bandaged with a flannel bandage, or sheet wadding. Making use of a previously shrunken

gauze or crinoline bandage, immerse it in the starch fluid until it is well saturated, then apply as you would a plaster-of-Paris bandage. Probably a much neater way is to apply the bandage dry and then paint it with the liquid starch. As many layers as desired are applied, reënforced, if necessary, by strips of metal, card-board, etc.

Care must be taken in the application of starch dressing that due allowance be made for any shrinkage that may occur.

The two objections to the dressing are its lack of strength and the long time it takes to get dry and hard, 24 to 36 hours usually being necessary.

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