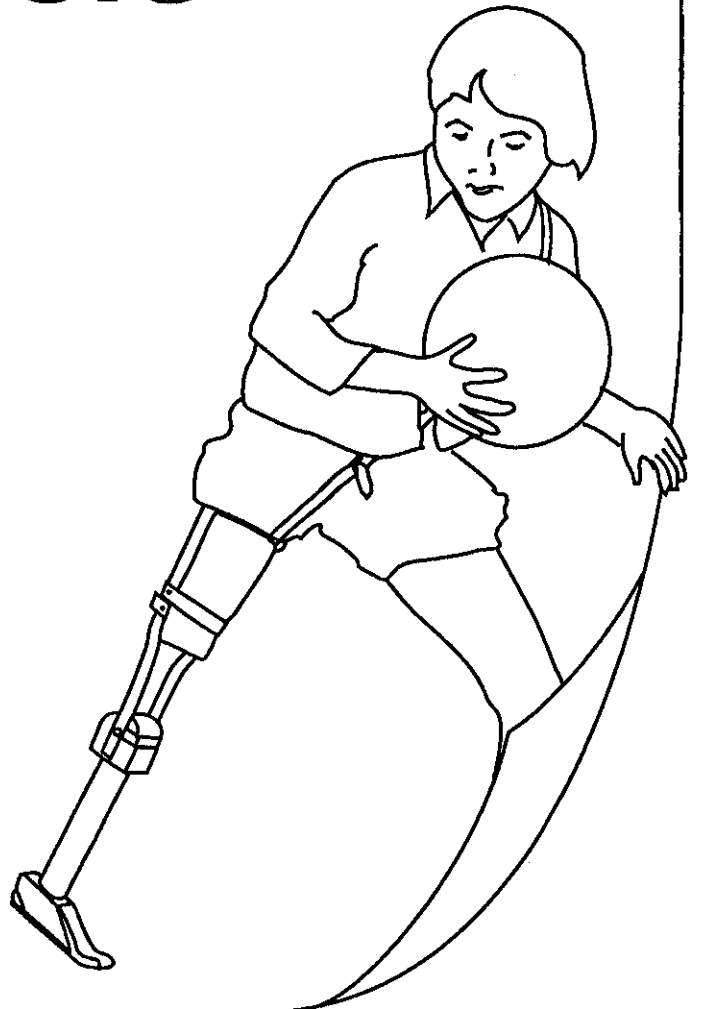
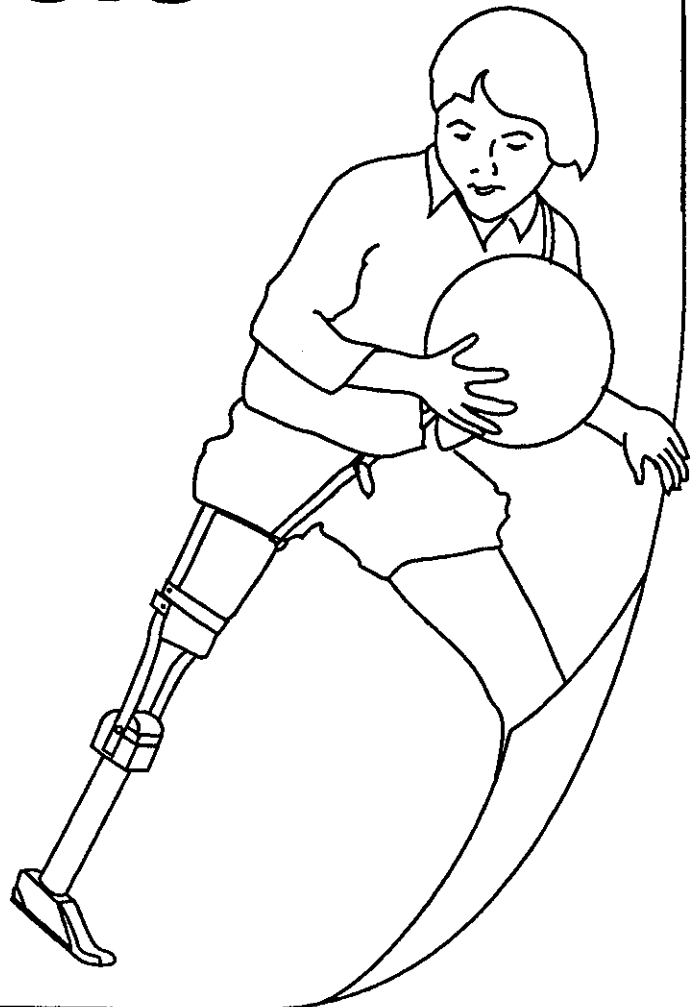


the femoral prosthesis



the femoral prosthesis



This manual has been written in cooperation with ~~the~~ HANDICAP INTERNATIONALE's teams in France, Thailand, Kampuchea and Laos.

N O T E

This technical manual has been prepared for two purposes: to provide a teaching guide for local technicians and to serve as an easy-to-follow aide memoire at various stages during the fabrication of devices.

This manual is devoted to the steps to be followed in the fabrication of the classical femoral prosthesis as produced by OHI programmes in several countries. It should be noted that some variables, albeit not limiting in nature, are suggested herein.

NB: Total understanding of the technical terms in brackets throughout this manual is not a prerequisite for high quality production of the femoral prostheses.

An amputation of the right thigh has been arbitrarily chosen for the purposes of this manual.

C O N T E N T S

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2. Taking measurements on the amputee	14
3. Preparing a plaster mould (the negative)	20
4. The positive mould	29
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CHAPTER 1 : ANATOMY

- conventional names
- the muscles and their functions
- the pressure bone (the ischium)
- front view
- side view
- back view

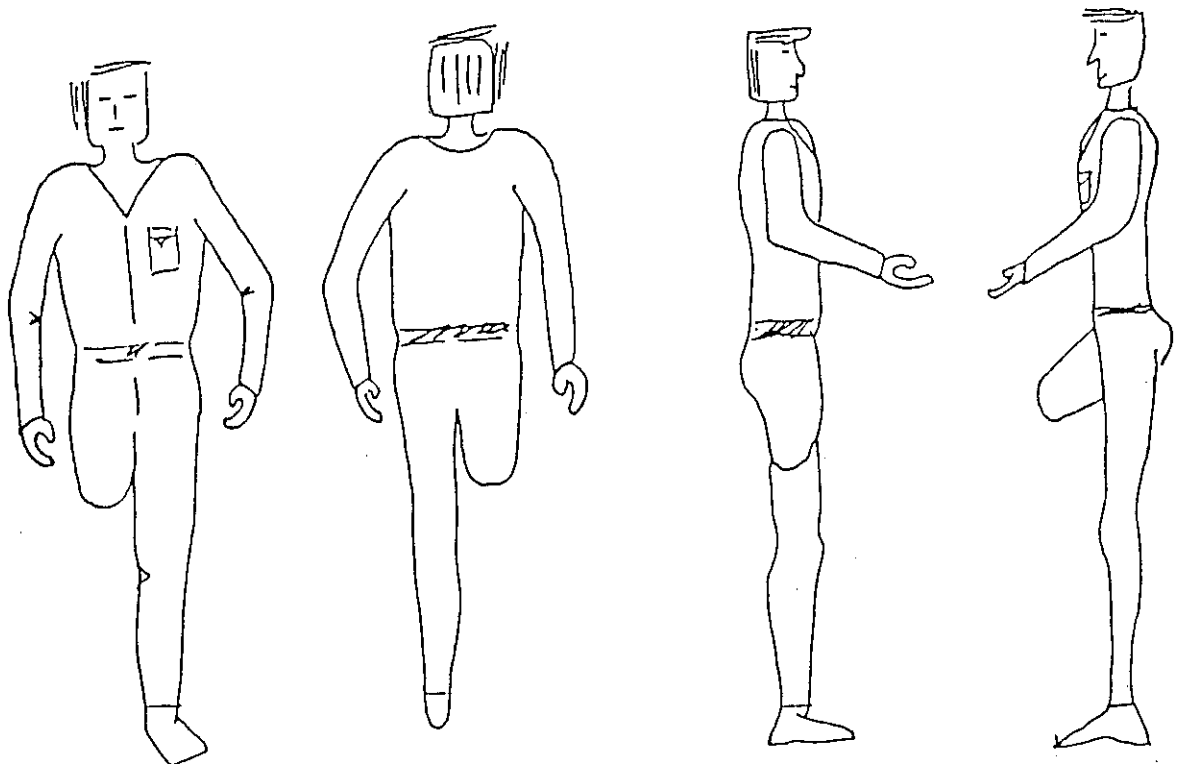
Note: This sub-section is mainly devoted to those providing the training.

Conventional names may be applied to the four sides of the stump.

These names are used in the chapters of this manual describing the fabrication of the first plaster casts (positive and negative) and the leather prosthesis, and on the devices themselves.

The sides are called walls, for example:

The front :	the anterior wall
The back :	the posterior wall
Offside :	the external wall
Onside :	the inner wall



front view

back view

onside view

offside view

THE MUSCLES AND THEIR FUNCTIONS

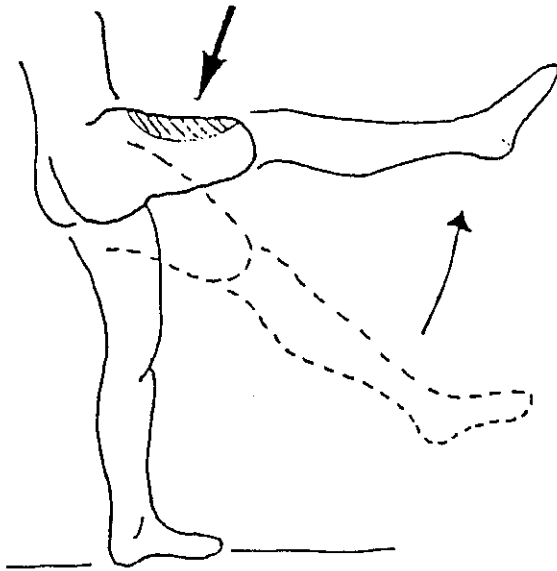
There are four groups of important muscles:

- 1) those which allow you to raise your leg forwards (flexion)
- 2) those which allow you to stretch your leg backwards (extension)
- 3) those which allow you to raise your leg to the side (abduction)
- 4) those which allow you to bring your leg back into a normal standing position (adduction).

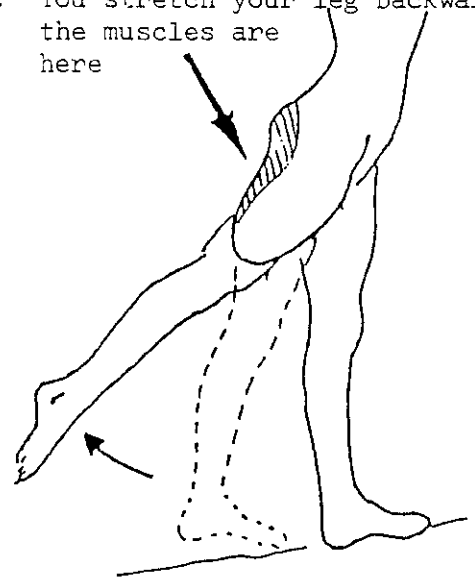
Two other groups of muscles allow movement:

You can feel these muscles working yourself by placing your hand on the places indicated by the large arrows.

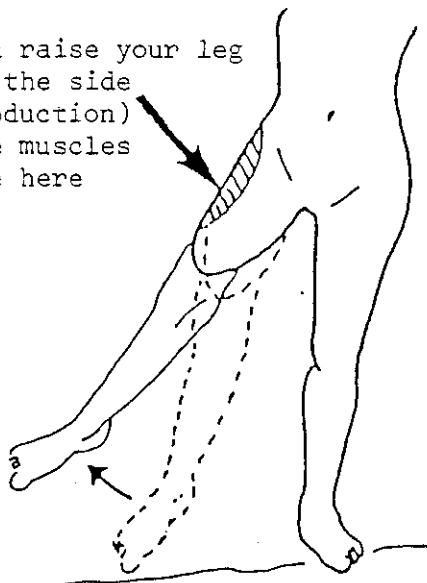
1. You raise your leg (flexion)
the muscles are here



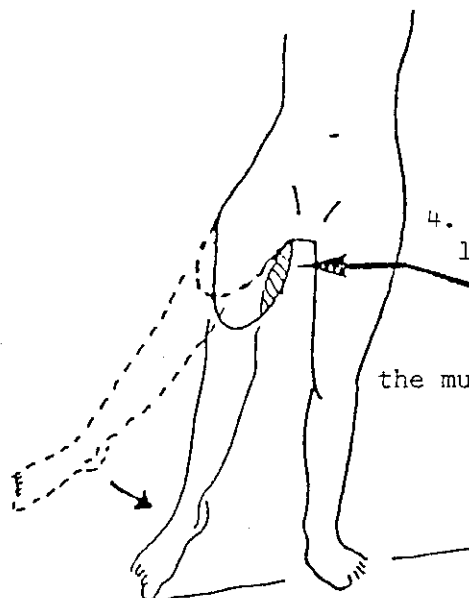
- (extension)
2. You stretch your leg backwards
the muscles are here



3. You raise your leg
to the side
(abduction)
the muscles are here



4. You bring your
leg back to a
standing
position
(adduction)
the muscles are here

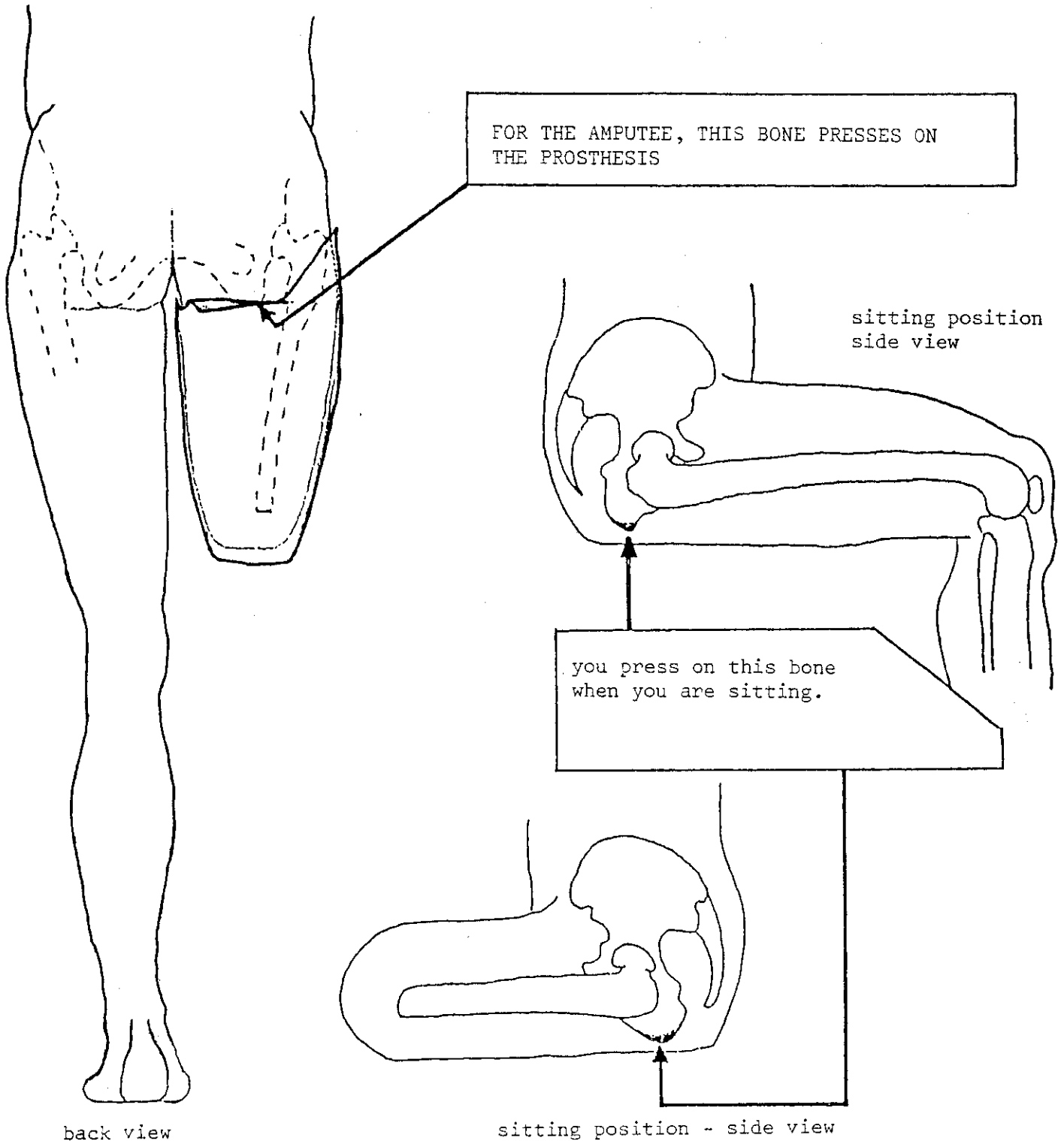


THE PRESSURE BONE (THE ISCHIUM)

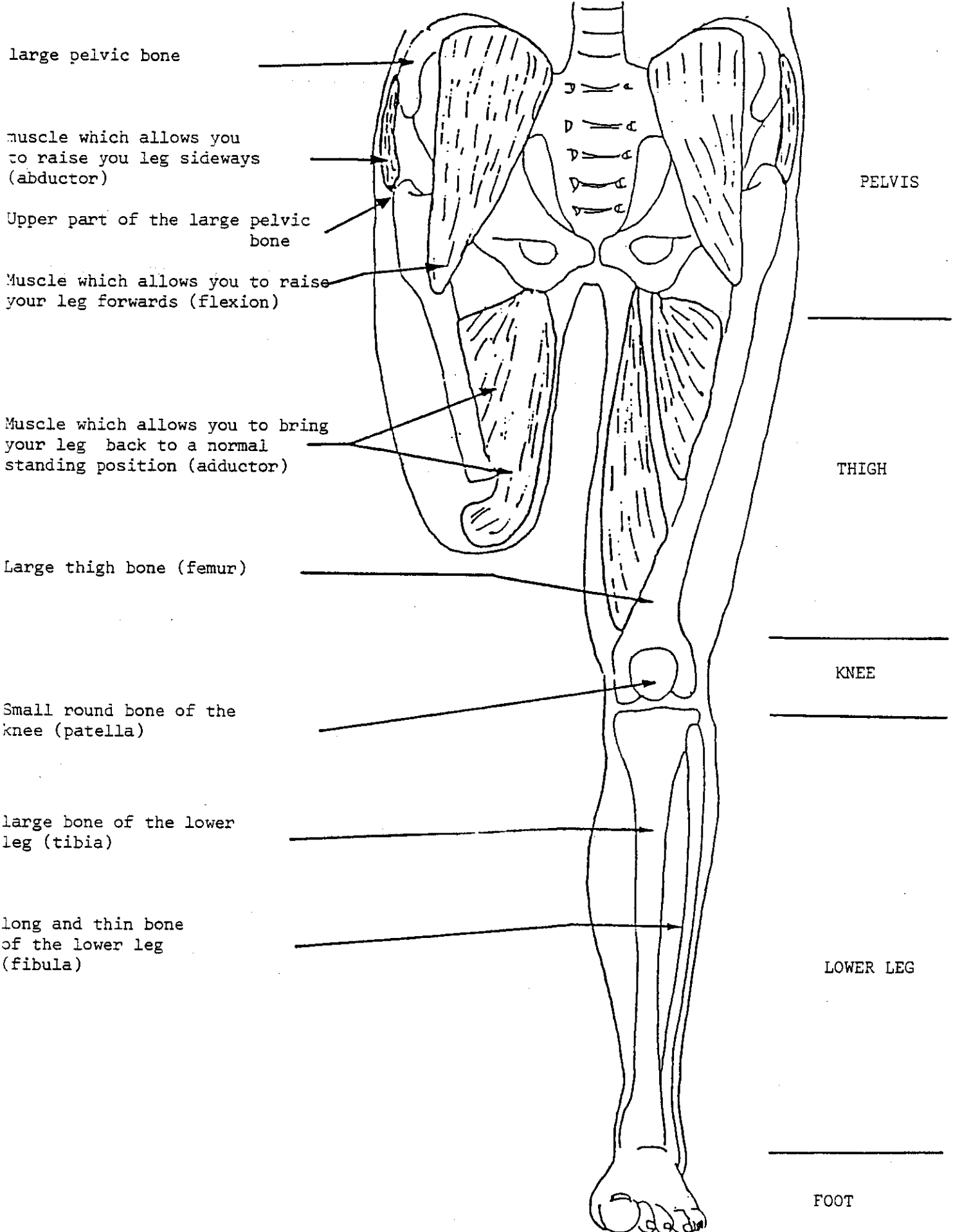
This bone is the lower part of the large pelvic bone.

It is the bone we press on when we are sitting. It is the one which will press on the prosthesis.

You press on this bone when you are seated.



ANATOMY _ FRONT VIEW



large pelvic bone

muscle which allows you to raise you leg sideways (abductor)

Upper part of the large pelvic bone

Muscle which allows you to raise your leg forwards (flexion)

Muscle which allows you to bring your leg back to a normal standing position (adductor)

Large thigh bone (femur)

Small round bone of the knee (patella)

large bone of the lower leg (tibia)

long and thin bone of the lower leg (fibula)

PELVIS

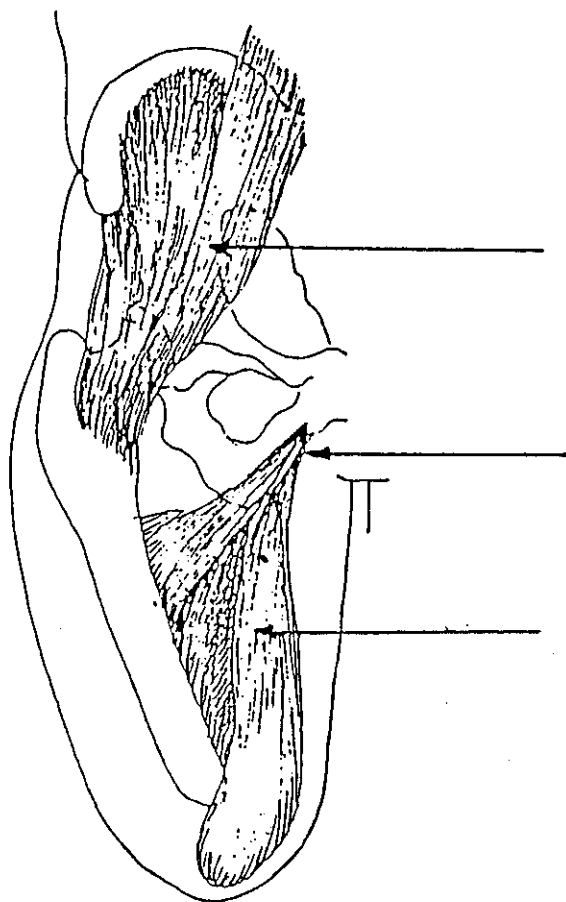
THIGH

KNEE

LOWER LEG

FOOT

THE MUSCLES



Muscle which allows you to raise your leg forwards

attachment of the muscle

Muscle which allows you to bring your leg back to a normal standing position

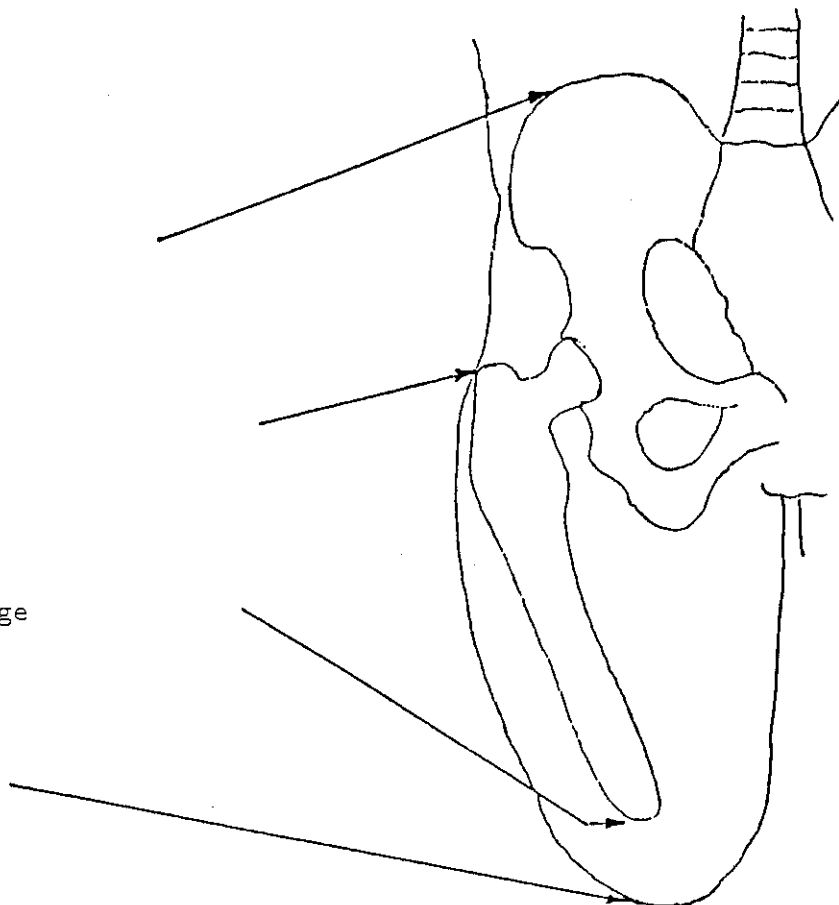
THE BONES

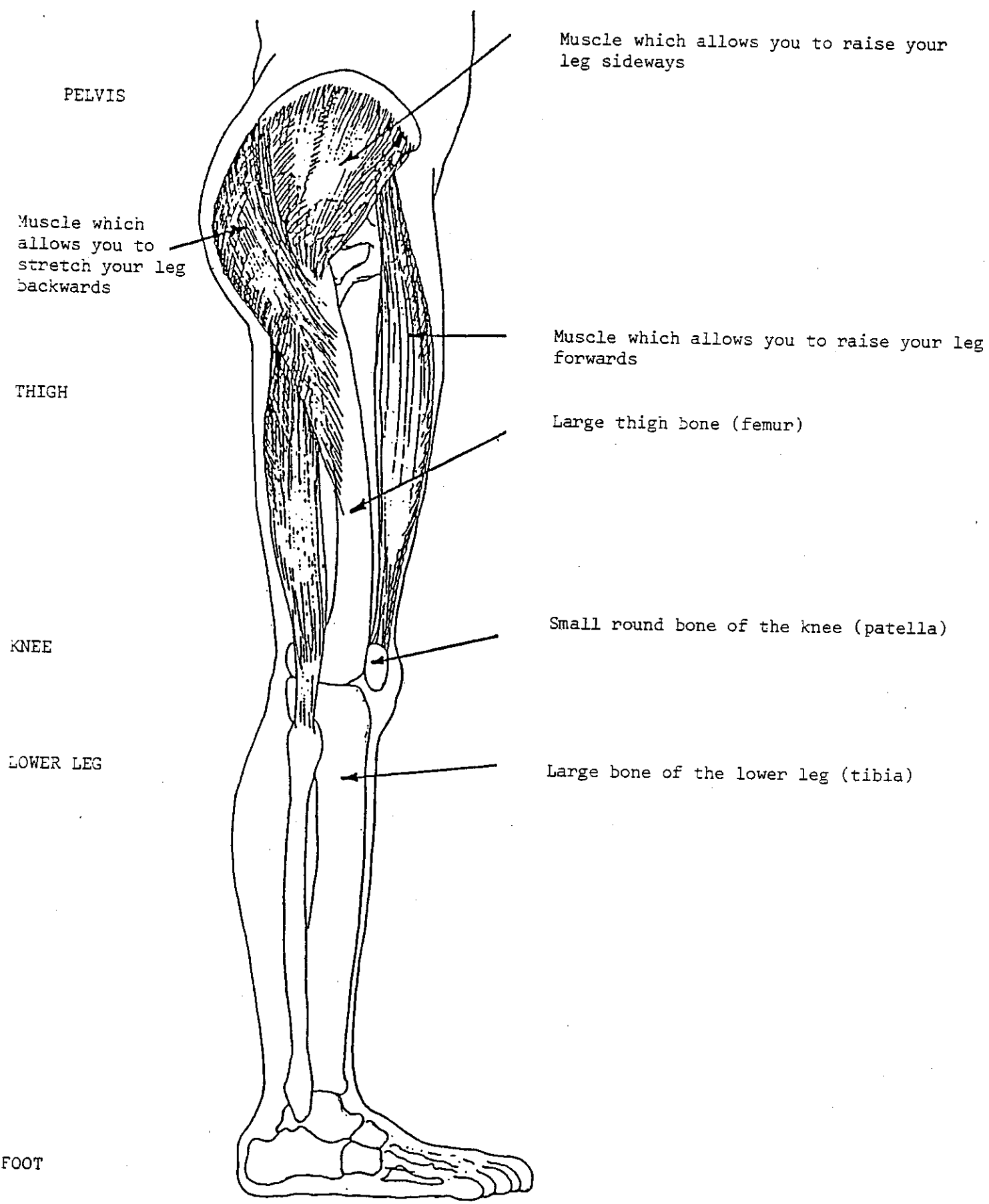
Upper edge of large pelvic bone

Upper extremity of large thigh bone

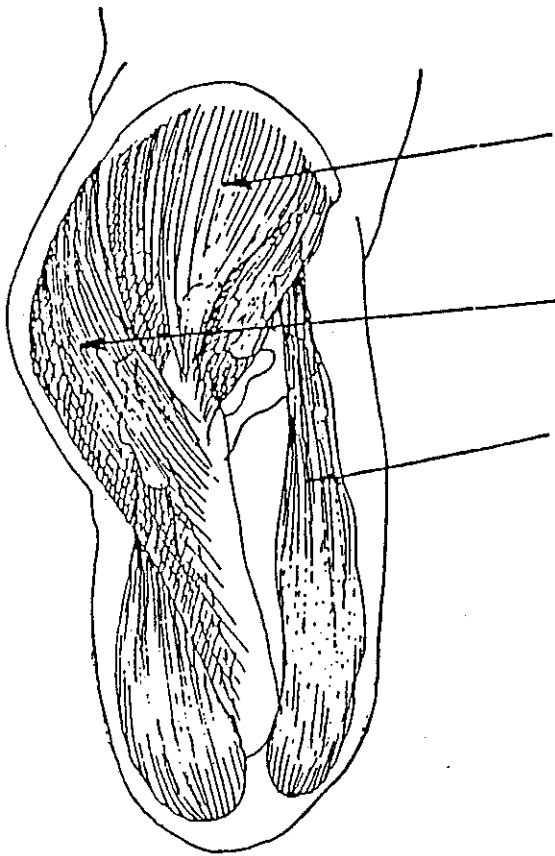
Amputated extremity of large thigh bone

amputation





THE MUSCLES

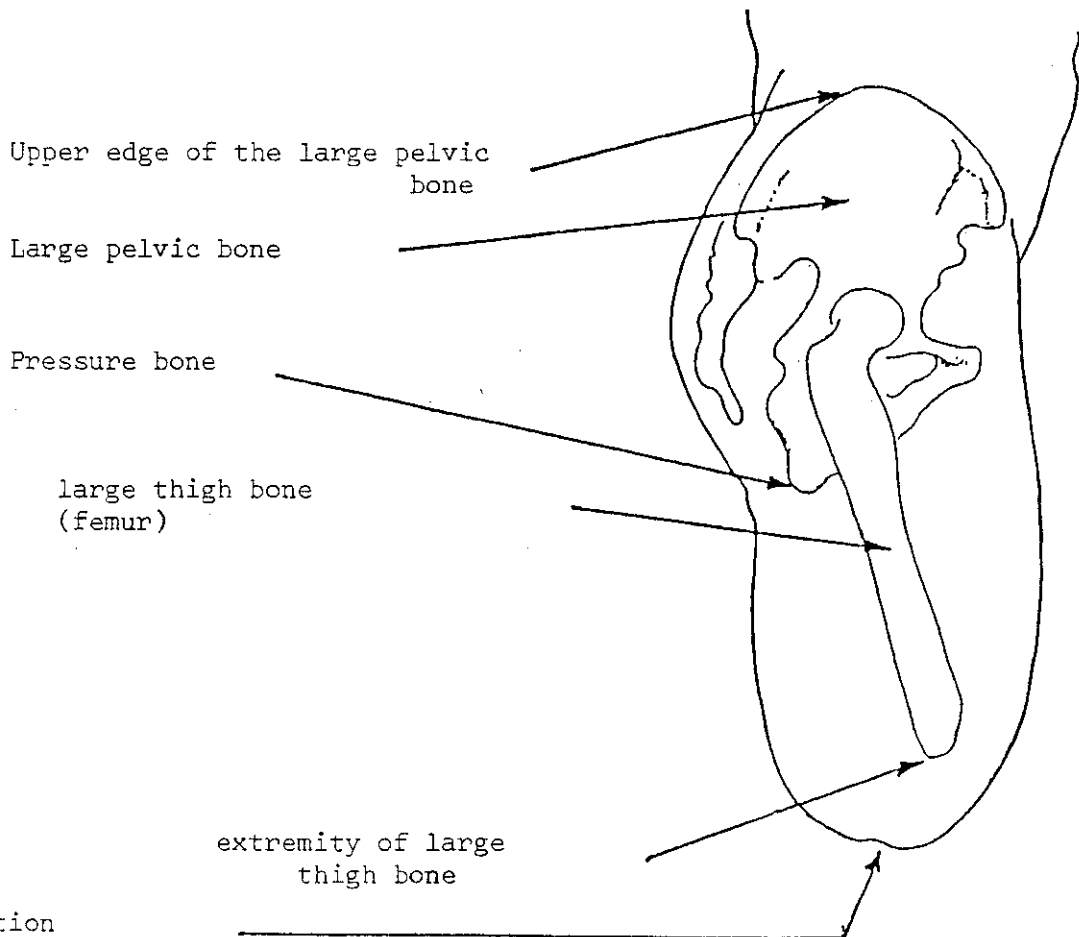


muscle which allows you to raise you leg sideways

Muscle which allows you to stretch your leg backwards

Muscle which allows you to raise you leg forwards

THE BONES



Upper edge of the large pelvic bone

Large pelvic bone

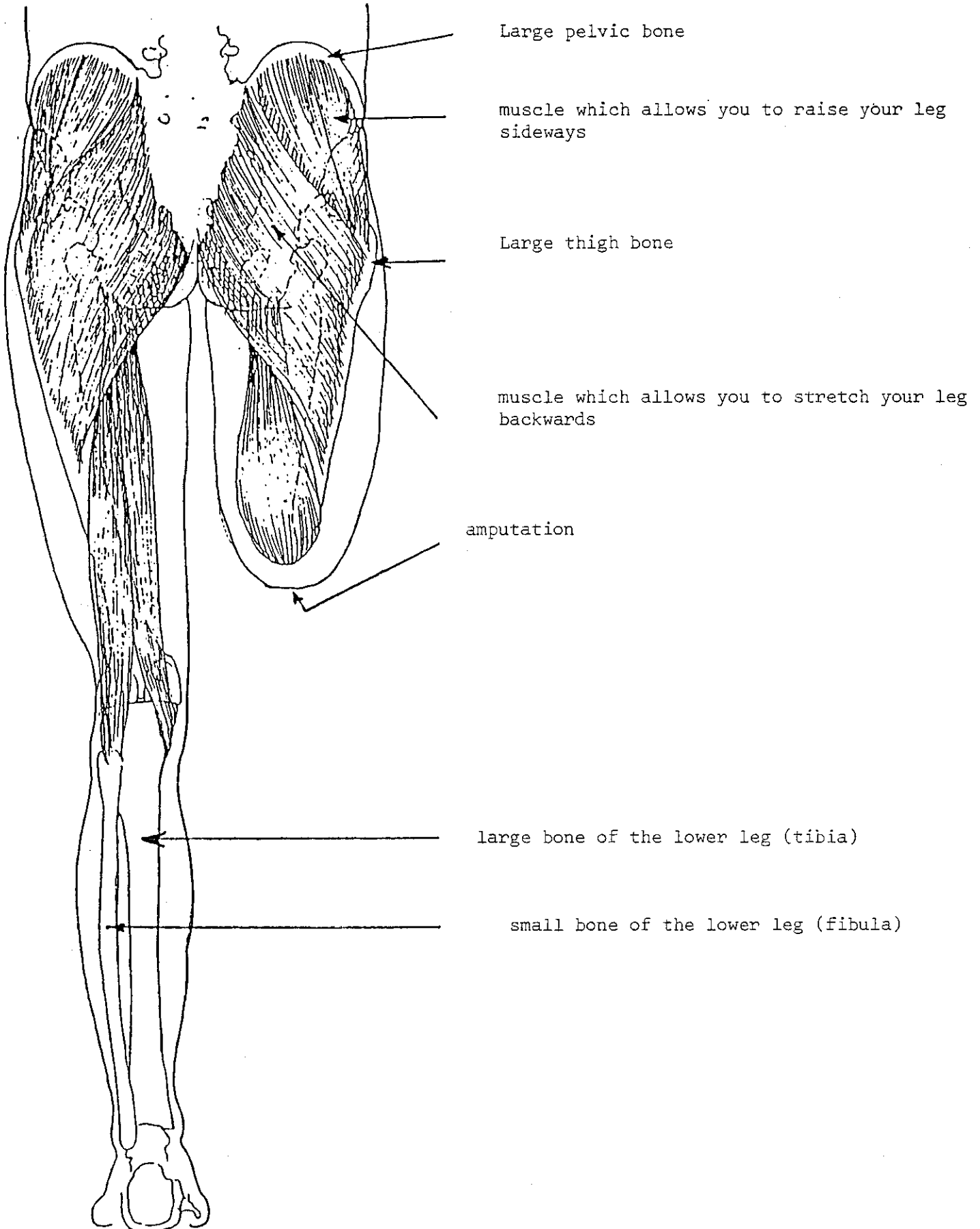
Pressure bone

large thigh bone (femur)

extremity of large thigh bone

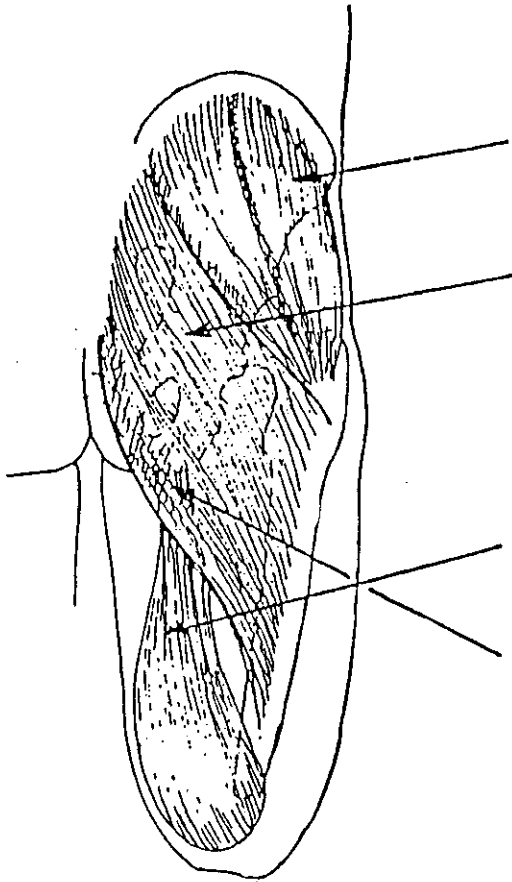
amputation

BACK VIEW



BACK VIEW

THE MUSCLES



Muscle which allows you to raise your leg sideways

Muscle which allows you to stretch your leg backwards

Muscle which allows you to bring your leg to a normal standing position

attachment of the muscle

THE BONES

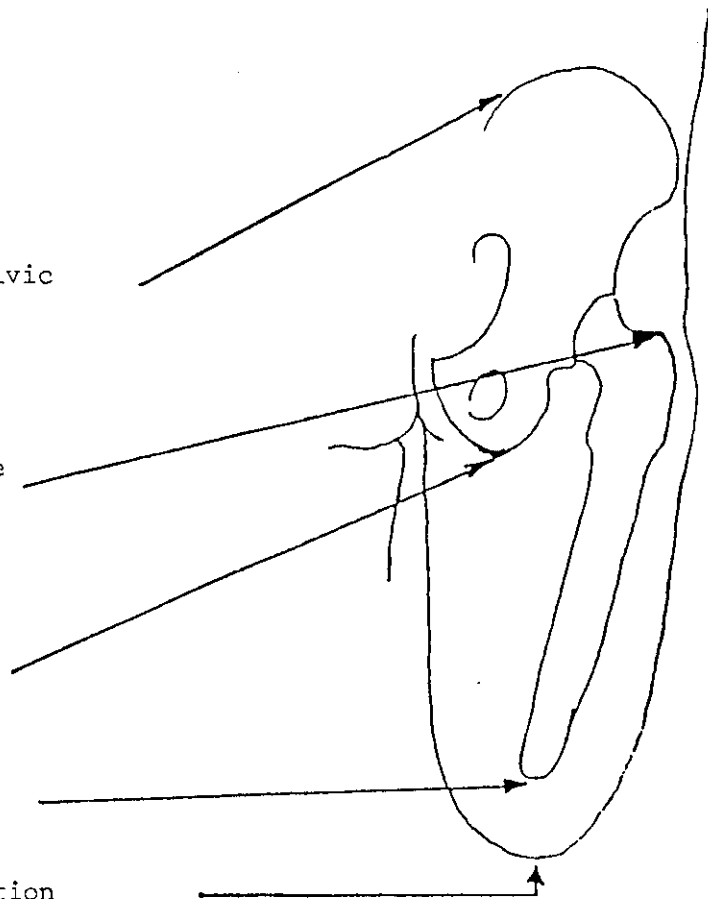
Upper edge of large pelvic bone

Upper extremity of large thigh bone

Pressure bone (ischium)

Lower extremity of large thigh bone

amputation



CHAPTER 2 : TAKING MEASUREMENTS ON THE AMPUTEE

- the technical data sheet
- lengths
- circumferences
- the size of the internal wall

THE TECHNICAL DATA SHEET

This simple data sheet, if well completed, will permit the technician to have readily to hand the name of the amputee, results of the examination, the first sketch of the stump, and the necessary measurements and calculations to allow for the fabrication of the prosthesis.

PROJECT

first sketch

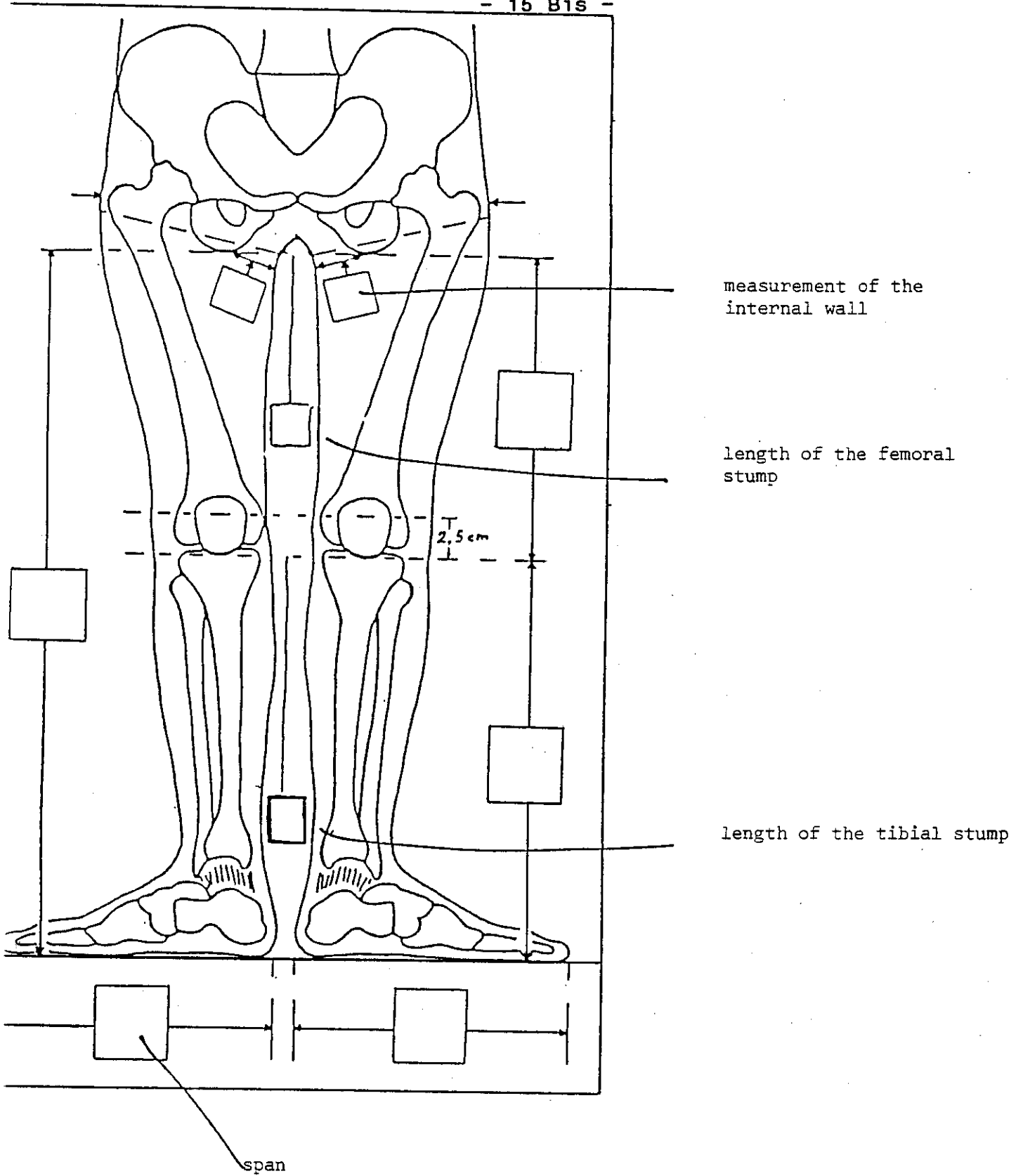
identification

examination

measurements

calculations

translated into the local language, this data sheet is an indispensable guide for technicians.

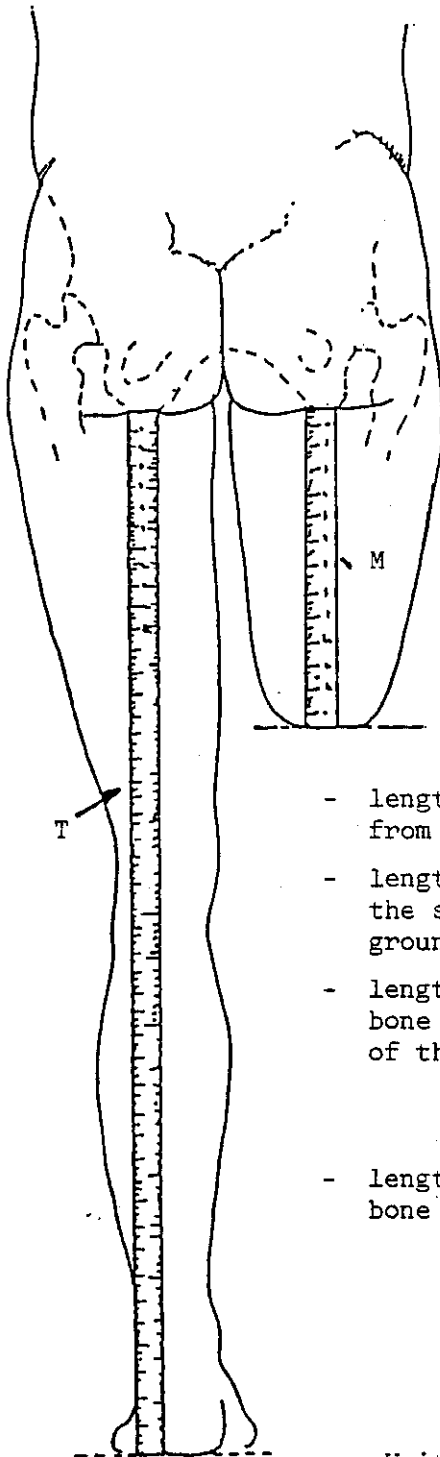


LENGTHS

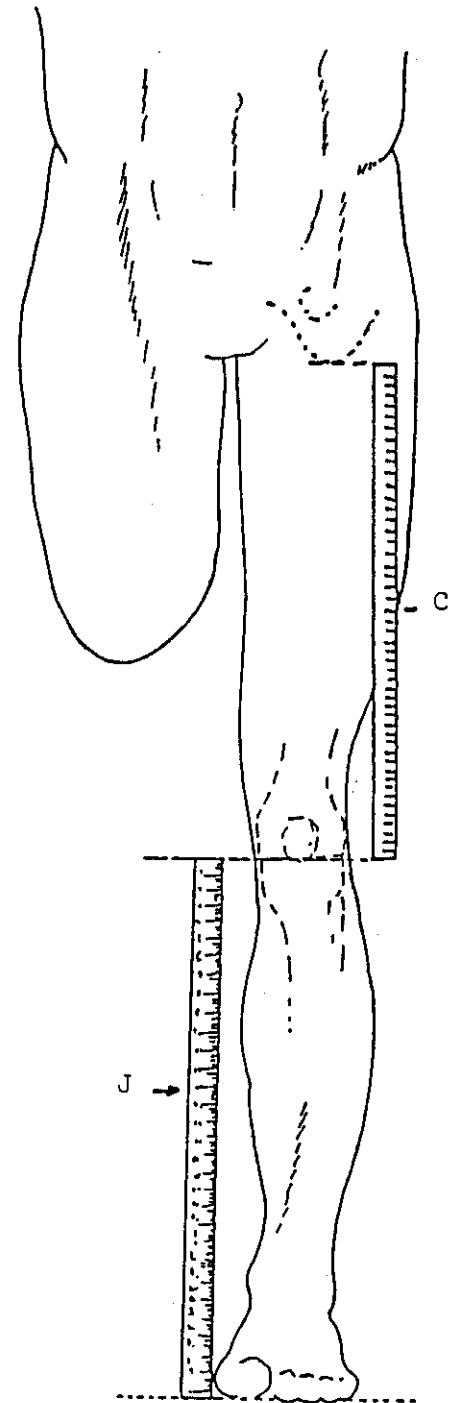
Four lengths interest us:

- 3 lengths of the entire limb
- 1 length of the stump

BACK VIEW



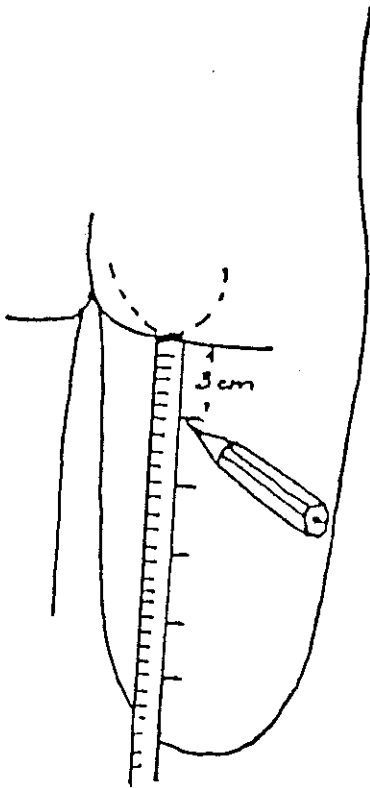
FRONT VIEW



- length of the entire limb: from the pressure bone to the ground (T)
 - length of the leg: from below the small bone of the knee to the ground (J)
 - length of the thigh: from the pressure bone to just below the small bone of the knee (C)
- $C + J = T$
- length of the stump: from the pressure bone to the extremity of the stump (M)

Write the measurements on the technical data sheet

CIRCUMFERENCES

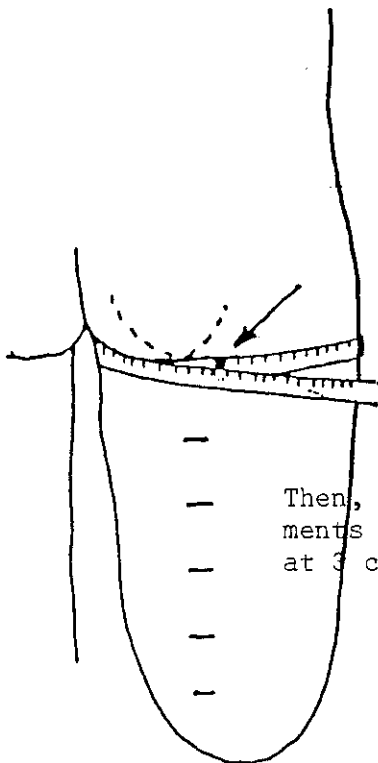


From the pressure bone, make guidemarks at 3 cm intervals on the stump

Example: 7 guidemarks for an 18 cm stump

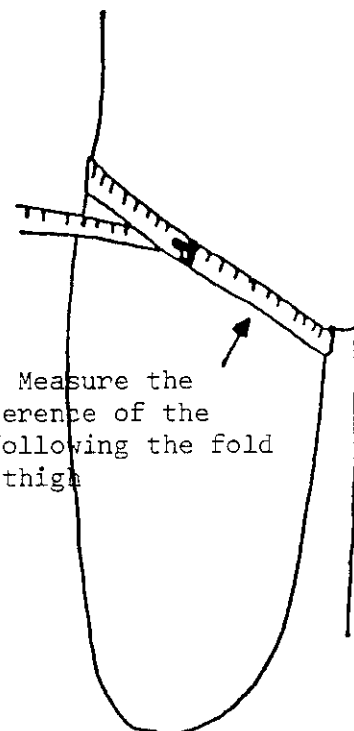
This measurement is the average between the tight and loose measurement.

Measure the circumference of the stump just beneath the pressure bone



Then, take regular measurements in the same way - at 3 cm intervals

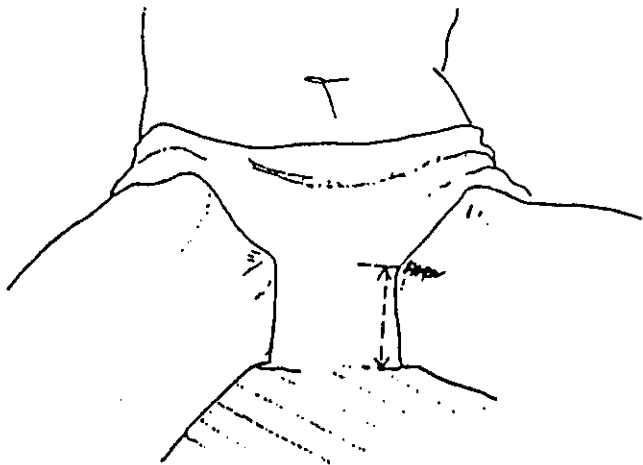
Measure the circumference of the stump following the fold of the thigh



Write the measurements on the technical data sheet.

THE SIZE OF THE INTERNAL WALL

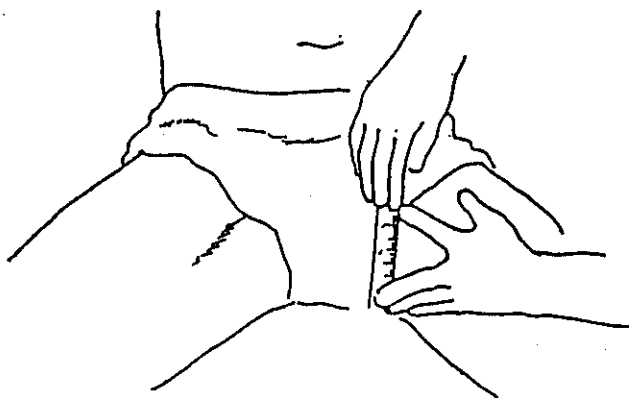
This measurement is taken while the amputee is sitting down. Measure between the thighs, (the span), at the level of the pressure bone.



This measurement is taken in the inner thigh. Measure the size of the internal wall between the seat and the place where the muscles are attached (the muscular cord) on the front.

Substract 1.5 cm from the measurement taken

EXAMPLE: for 8 cm
measurement of the internal wall will be
 $8 \text{ cm} \text{ minus } 1.5 \text{ cm} = 6.5 \text{ cm}$



Write this information on the technical data sheet.

CHAPTER 3 : PREPARING A PLASTER MOULD (THE NEGATIVE)

- preparation of the stump
- the plaster mould
- position of the hands
- removing the plaster mould
- preparing the plaster negative

In order to be able to produce the leather prosthesis, it is first necessary to make a copy of the stump.

From the available materials, there are two ways in which this may be achieved:

- making a plaster cast or mould with special bandages into which plaster, wax or paraffin is poured.

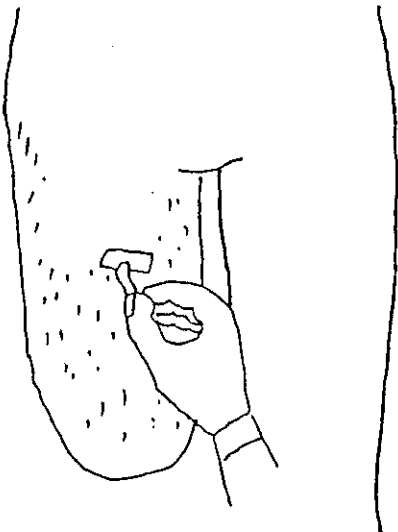
THIS METHOD IS CALLED THE NEGATIVE - POSITIVE SYSTEM

- carving or sculpting a piece of wood or a block of wax or paraffin, matching the exact form and dimensions of the stump.

THIS METHOD IS CALLED THE DIRECT POSITIVE (for further explanation of this method, see Annex 1)

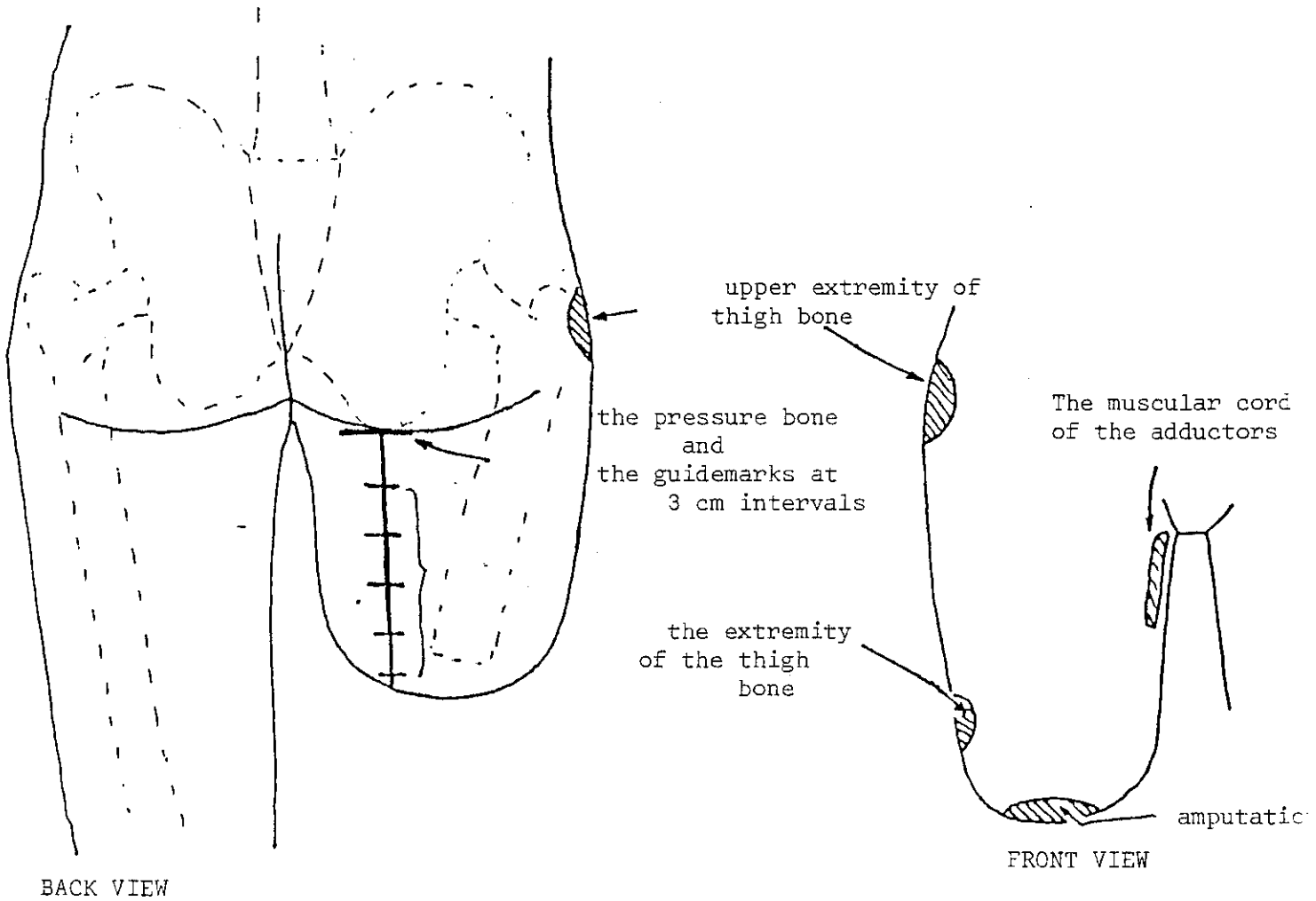
Described below is the NEGATIVE - POSITIVE SYSTEM

PREPARATION OF THE STUMP



shave the stump if necessary; this prevents body hair from being caught in the plaster.

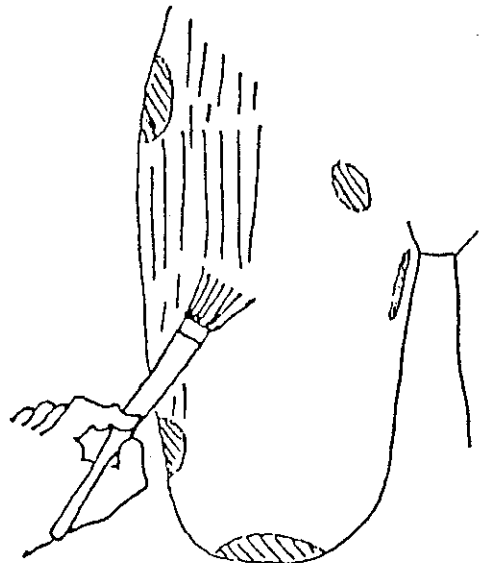
0 Stain the important guidelines on the skin with gentian violet



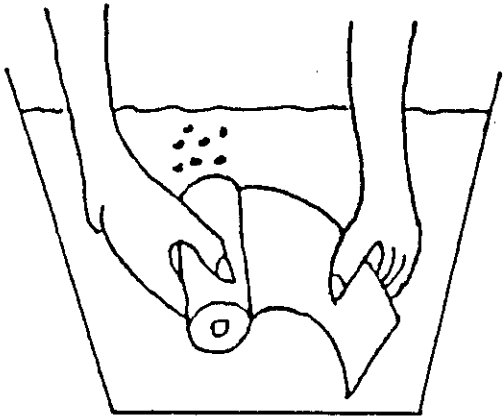
BACK VIEW

FRONT VIEW

o oil the stump (using coconut oil or vaseline)
or use talcum powder; this will make removal of
the plaster easier.



THE PLASTER MOULD



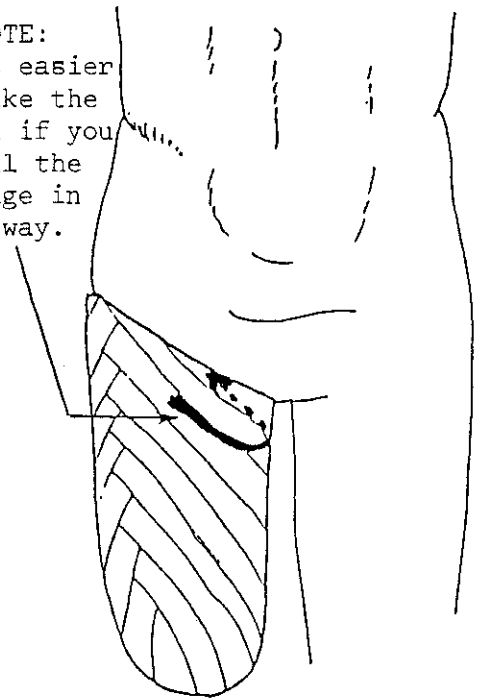
- o Dip the plaster bandage into water for a few seconds. Make sure all air bubbles are released.
- o Remove the plaster bandage from the water and squeeze it gently to remove excess water.
- o The amputee should be standing up, his hands resting on supports placed at the correct height.

- . Unravel the bandages on the stump, working upwards so as to cover the upper extremity of the large thigh bone
- . Do not affix the first bandage tightly.
- . The second bandage should be slightly tighter.
- . The third bandage should be tight.
- . Smooth the bandages out with your fingers during unrolling.

THE BANDAGES SHOULD BE AFFIXED IN AN ASCENDING MANNER AND SHOULD PASS ABOVE THE UPPER GUIDEMARK ON THE LARGE THIGH BONE

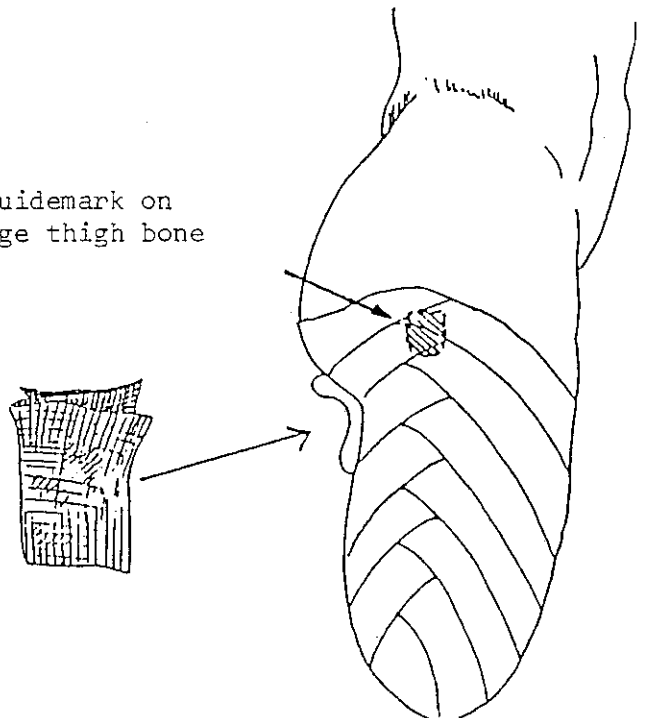
NOTE:

It is easier to make the mould if you unroll the bandage in this way.



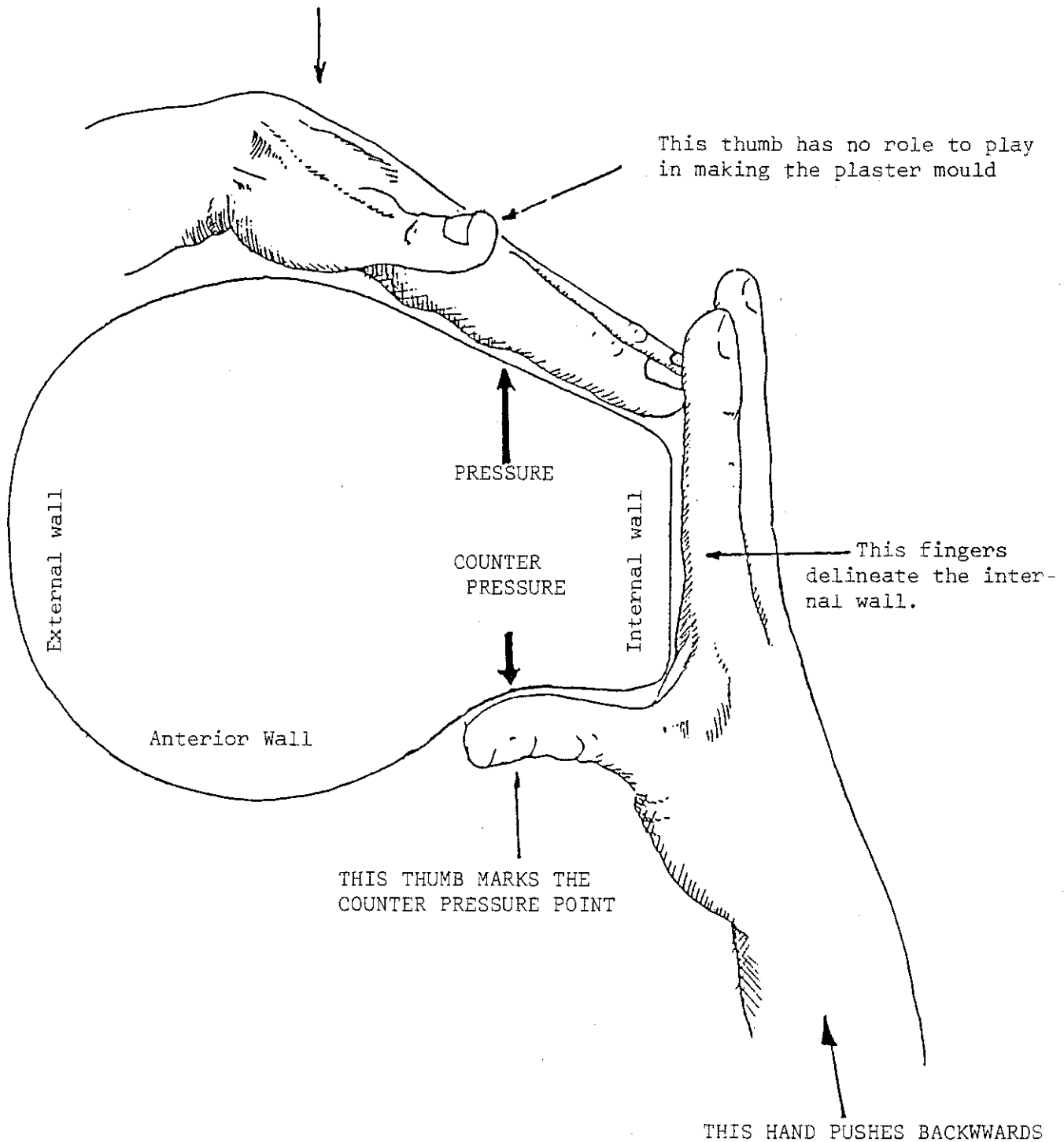
upper guidemark on the large thigh bone

- . Add a reinforcing piece of plaster bandage on the pressure point during the placement of the second bandate.



THE POSITION OF THE HANDS IN MAKING A
PLASTER MOULD

THIS HAND IS PUSHING UPWARDS
AND FORWARDS

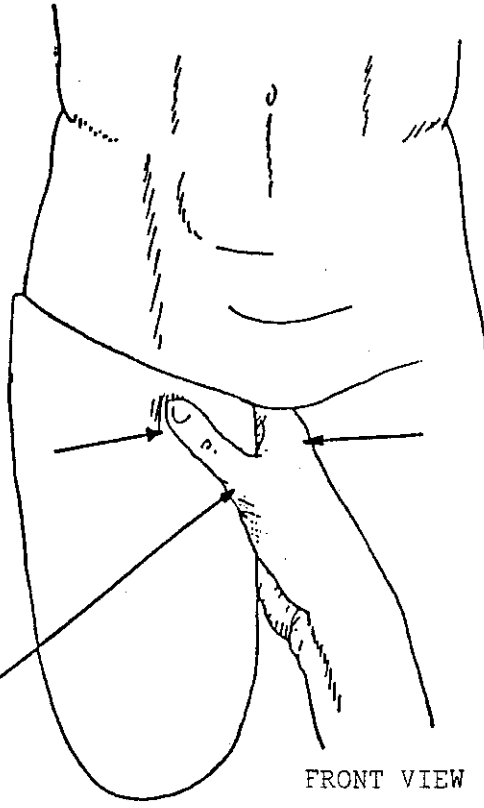


TECHNICAL NOTE: we can ask the patient to make a slight flexion of the stump so as to be able to clearly identify the ischium - after doing this, ensure that the stump is returned to a normal position.

MAINTAIN THIS POSITION WITHOUT MOVING AND DO NOT RELEASE THE PRESSURE UNTIL THE PLASTER IS DRY (sensation of heat).

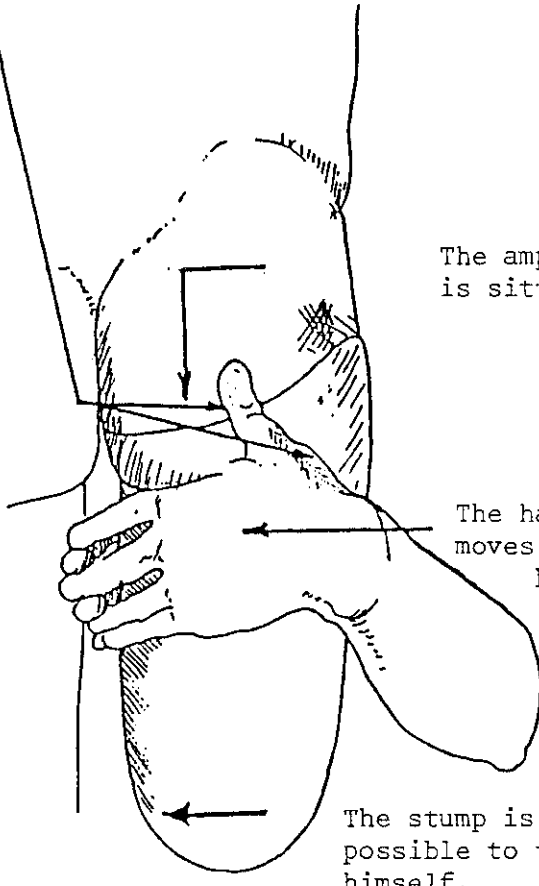
Hold the counter pressure point with the thumb in the hollow above the muscular cord

the rest of the hand should be in a vertical position so as to delineate the internal wall; fingers should be straight and in a horizontal position



FRONT VIEW

CAUTION: DO NOT PUT PRESSURE ON THE PLASTER IN THESE PLACES



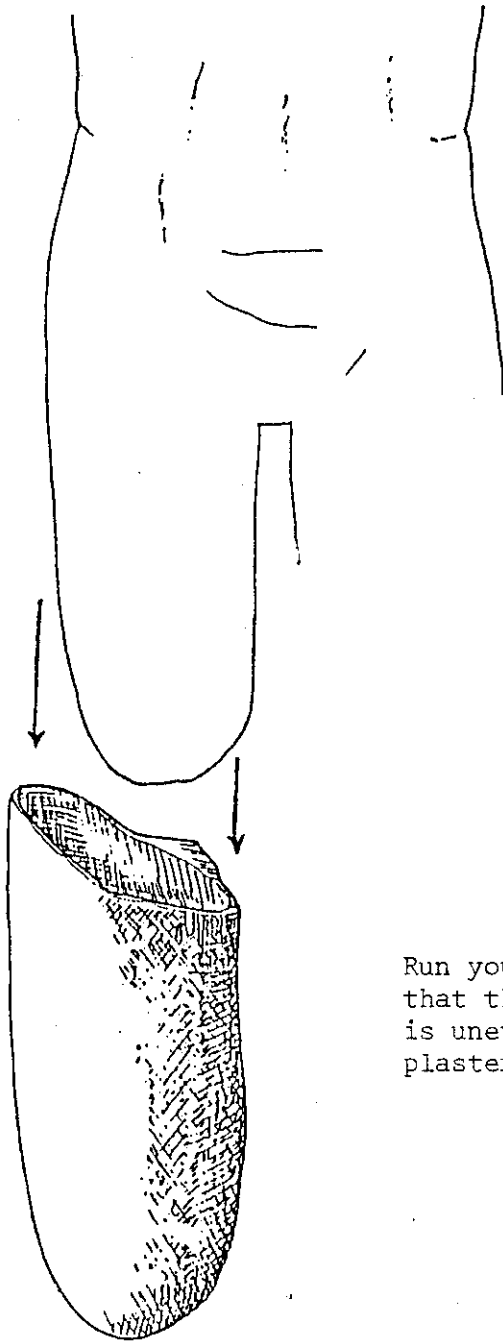
BACK VIEW

The amputee should feel as though he is sitting on this hand

The hand held straight pushes and moves upwards to locate the pressure bone.

The stump is brought back as closely as possible to the other leg by the amputee himself.

REMOVING THE PLASTER MOULD



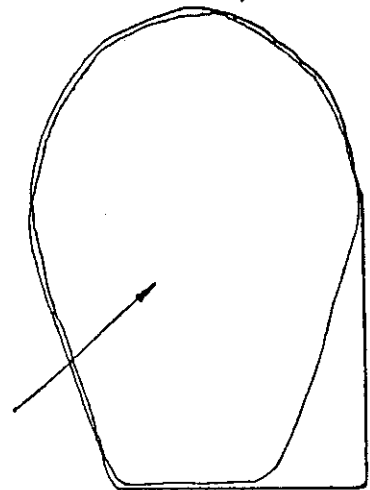
The plaster mould comes off easily by pulling it downwards.

Run your hand inside the the plaster mould to ensure that there are no significant areas where the surface is uneven as a result of having affixed the first plaster bandage too tightly.

PREPARING THE PLASTER NEGATIVE

- Cut out the negative before the plaster bandages are completely dry.
- You should be able to work the negative with your fingers; if handled carefully, it will not break.

THE NEGATIVE SHOULD LOOK LIKE THIS



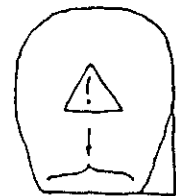
VIEW FROM ABOVE

CAUTION: YOU SHOULD NOT HAVE



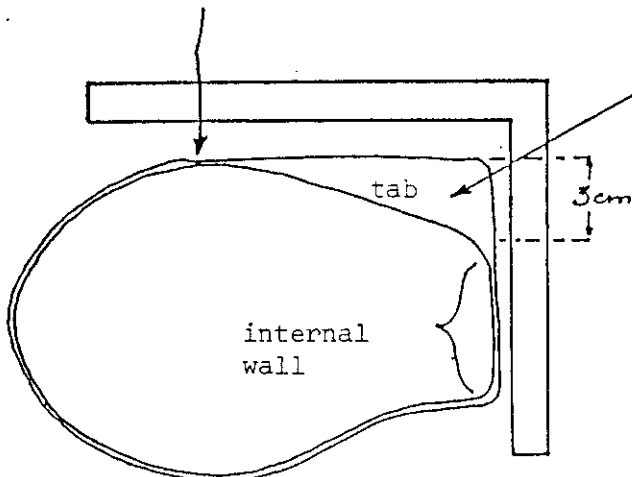
posterior wall
and internal wall
at a right angle

OR:



a too large
internal wall

The tab (flange) should be at around
1/3 ext.



VIEW FROM ABOVE

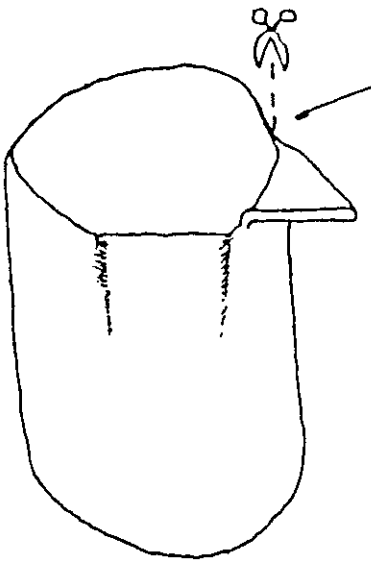
Viewed from above, the support tab is triangular in shape. The back of the tab or flange and the internal wall should be at right angles.

The tab should have the shape of a right angled triangle, with the small side measuring about 3 cm.

The internal wall should be FLAT. If necessary, shape it correctly before the plaster is completely dry.

. Turn the negative mould to a vertical position

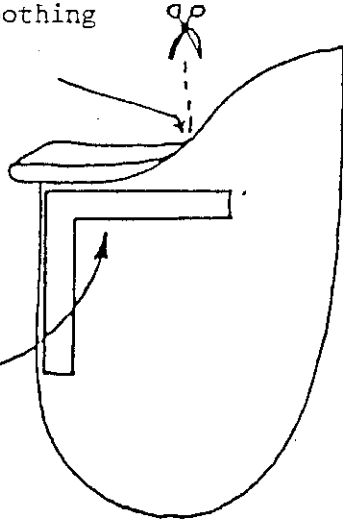
(If necessary, make incisions in the plaster to allow for smoothing it)



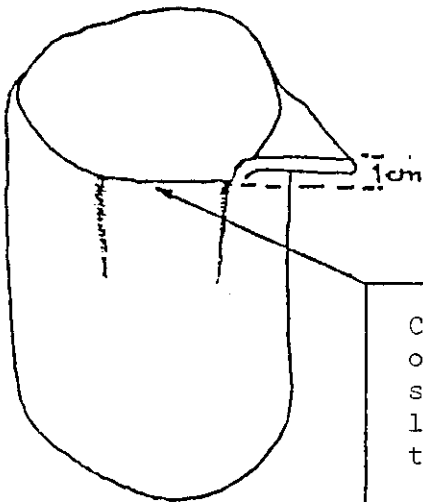
view of interior

THE PRESSURE TAB SHOULD BE HORIZONTAL

THE TAB IS ALSO PERPENDICULAR TO THE INTERNAL WALL



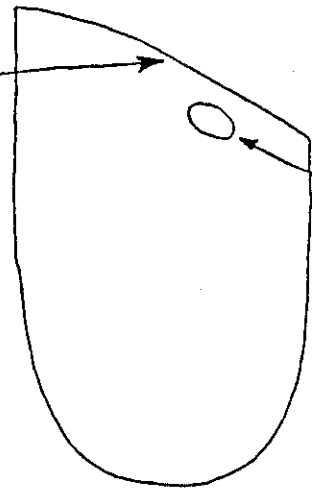
viewed from the back



view of interior

The anterior edge passes above the counter pressure and ascends on the outside until it reaches the upper guide-make on the thigh bone.

Cut out the upper edge of the internal wall so that it is 1 cm lower than the pressure tab



viewed from the front

YOU NOW HAVE A PLASTER NEGATIVE IDENTICAL TO THE CASING (SOCKET) TO BE MADE FROM LEATHER.
YOU MAY NOW TRY IT ON TO CHECK THAT THE AMPUTEE IS CORRECTLY SEATED ON THE PRESSURE TAB AND TO DIAGNOSES ANY PAINFUL PLACES.

CHAPTER 4 : THE POSITIVE MOULD

- casting the positive mould
- working the positive mould
 - . confirmatory measurments
 - . reinforcement

CASTING OF THE PLASTER POSITIVE

. Rotate the plaster negative on the piece of wood held securely in a vice.

. Place an extension of a piece of plaster bandage around the negative

. Once this extension has hardened, prepare the plaster

THE PROPORTIONS FOR MAKING GOOD QUALITY PLASTER ARE:

- 50 percent plaster
- 50 percent water

. Throw the plaster in a "rain drop" manner into the water

. Leave the plaster to dampen (it turns from white to grey) then mix it.

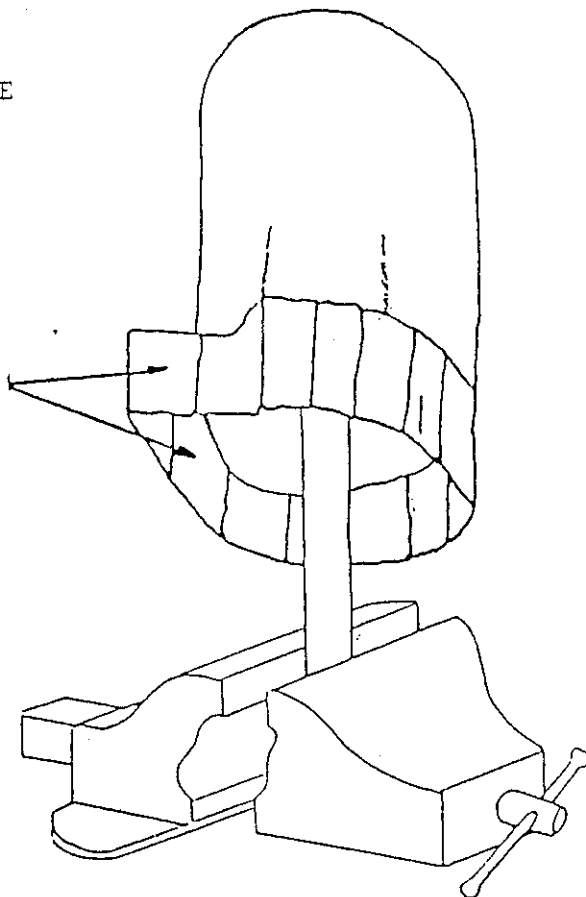
FOR ECONOMY :

- . Mix the plaster powder with 30 percent of filtered fine sand
- . Recycling of tibial plaster positives

TECHNICAL NOTES:

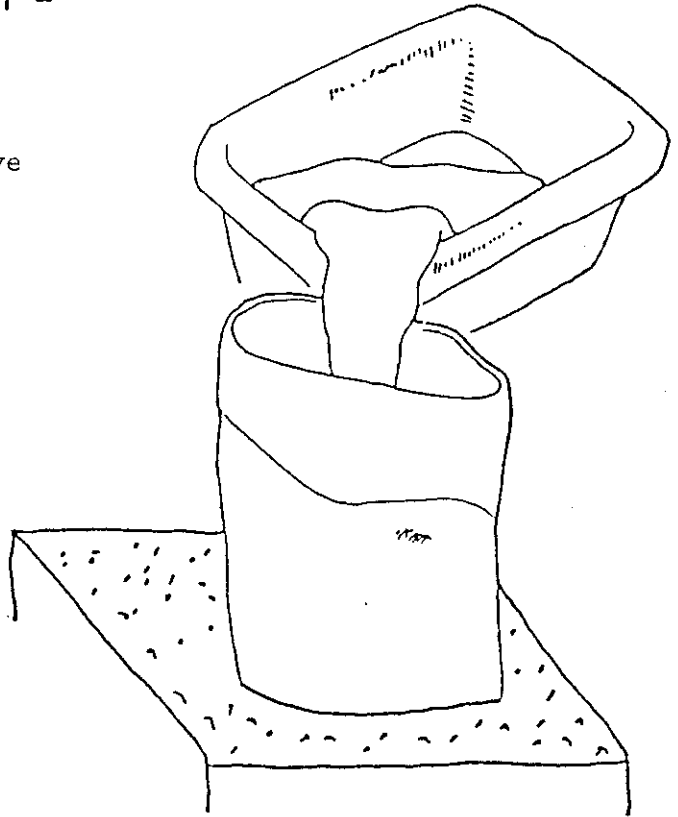
It is possible to vary the proportion of water used:

- more water, the cast will take longer to set, final resistance will be diminished
- less water, the cast will set more rapidly, the plaster positive will be very hard.



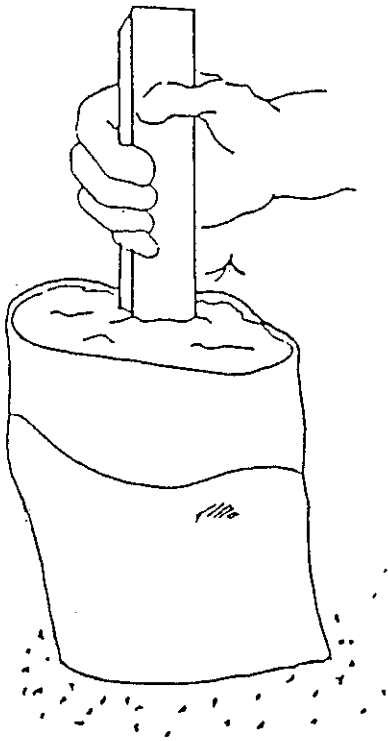
. wedge the negative in a bucket of sand
(more practical)

. pour the plaster into the negative



- . use a cylinder flattened at one end or a grooved piece of wood to stir the plaster.
- . stir the plaster to let the air bubbles rise to the surface

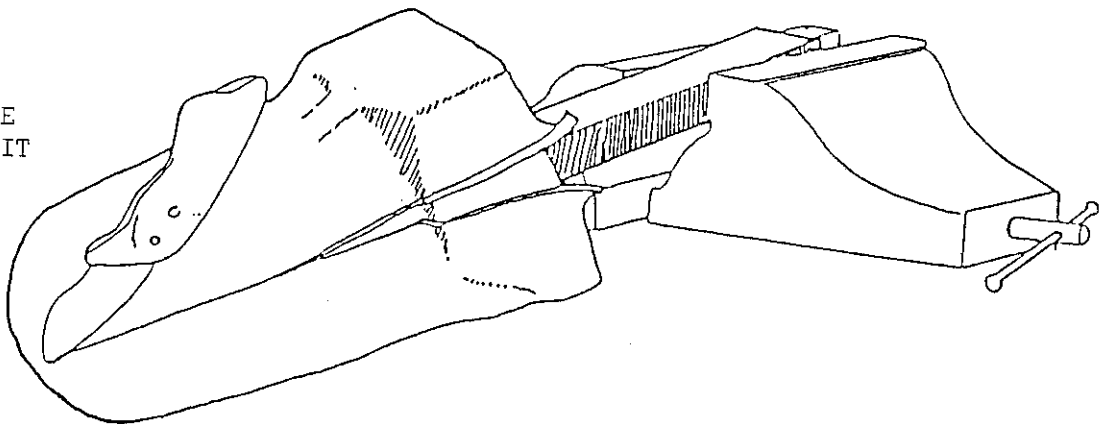
: REMARK: Wood swells or expands as it becomes humid in the plaster and can cause the plaster positive to shatter. Therefore, moisten the wood beforehand.



LEAVE IT TO HARDEN FOR
SEVERAL HOURS

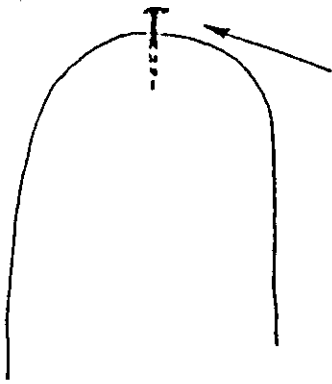
THEN

MAKE INCISIONS IN THE
NEGATIVE AND REMOVE IT
FROM THE MOULD.



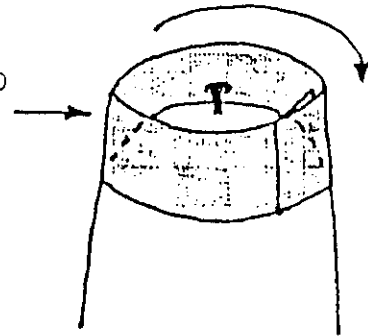
. Extending the edge of the stump.

- . an extension of 2 cm may be made at the tip of the stump.
- . this extension will afford the amputee greater comfort.
- . the preparation of such an extension is a nice touch, but is not essential. Thus, you are not obliged to make one, particularly in the case of a long stump.

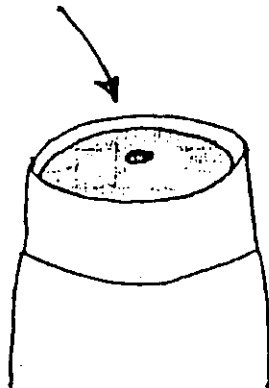


PLACE A NAIL 2 CM DEEP INTO THE PLASTER AT THE EXTREMITY OF THE PLASTER POSITIVE

ROLL A PAPER STRIP AROUND THE EDGE OF THE PLASTER POSITIVE

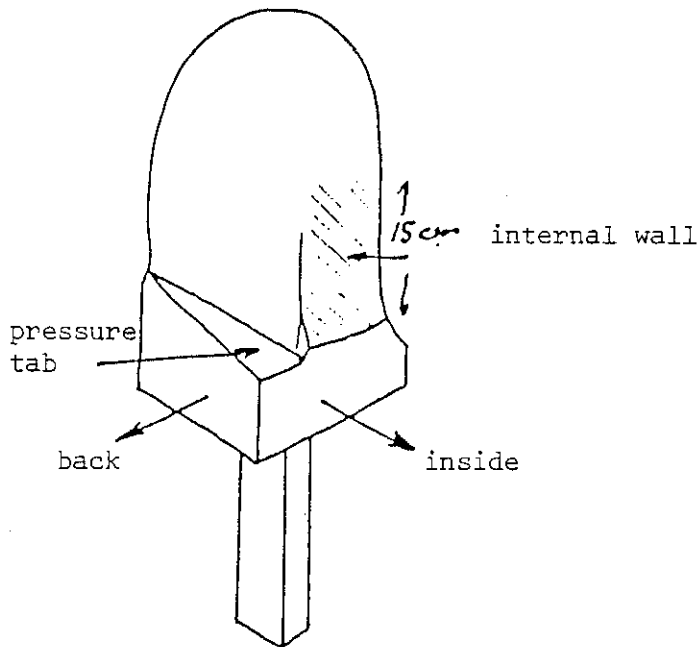


POUR PLASTER TO THE LEVEL OF THE HEAD OF THE NAIL



WORKING THE POSITIVE MOULD

. Working the positive mould is done with a knife, the used blade of a saw, a plane or a piece of wire mesh.

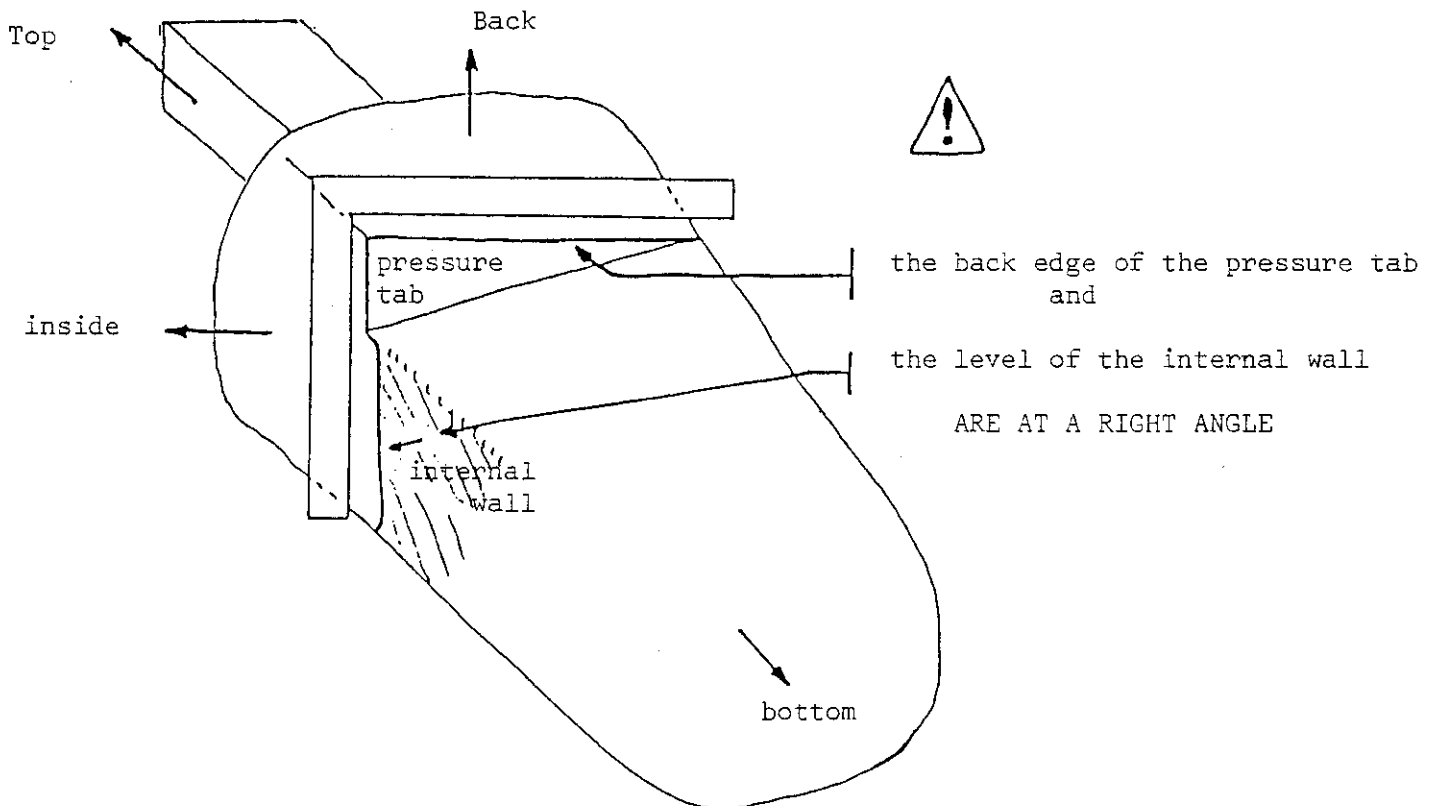


Define the internal wall with precision, by planing the surface between the pressure tab and the anterior wall.

THIS INTERNAL WALL IS PLANED TO A HEIGHT OF AROUND 15 CM

Trim and make level the pressure tab.

THE PRESSURE TAB SHOULD BE LEVEL AND TRIANGULAR IN SHAPE

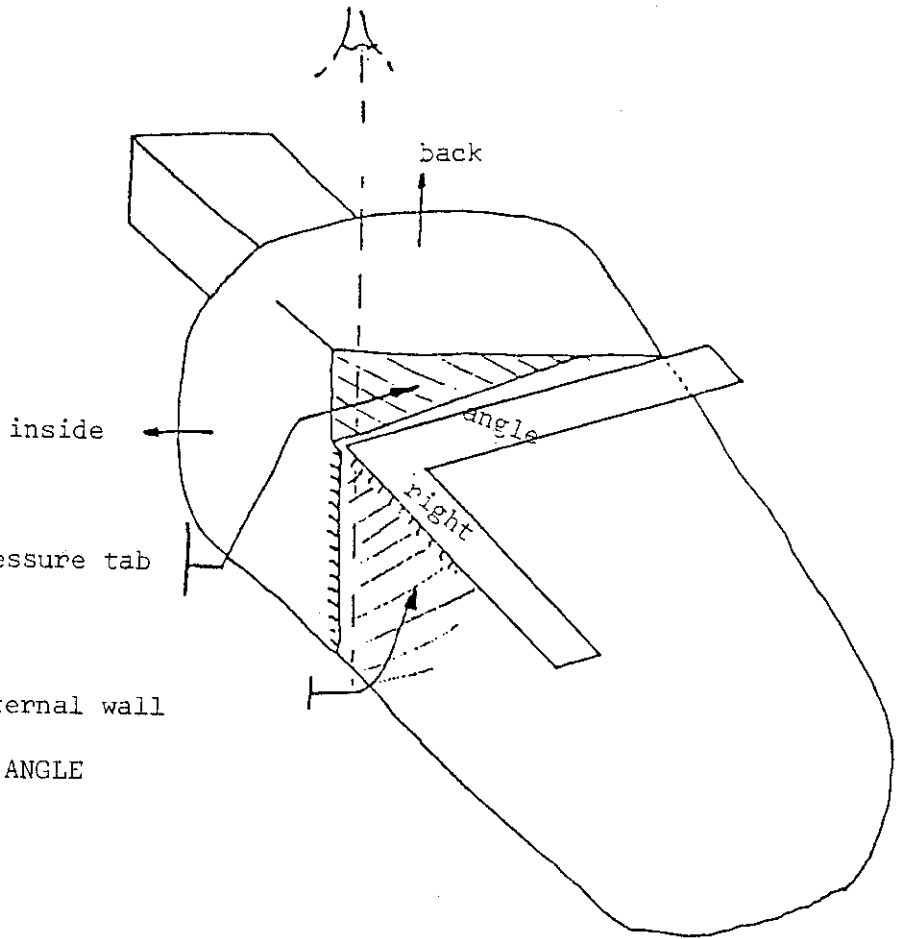


the back edge of the pressure tab and

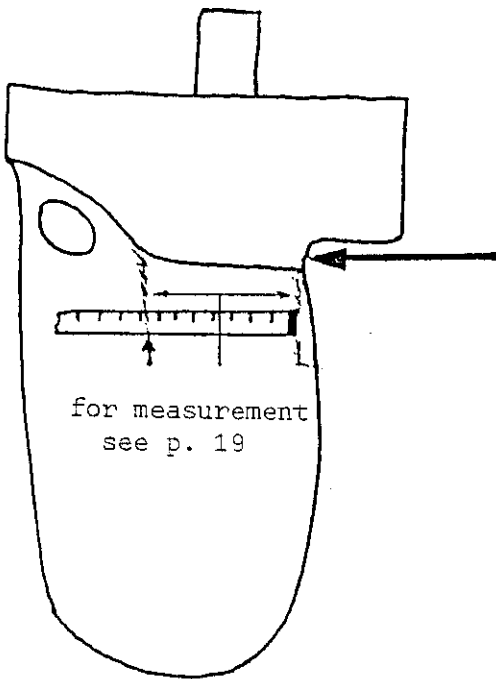
the level of the internal wall

ARE AT A RIGHT ANGLE

EQUALLY

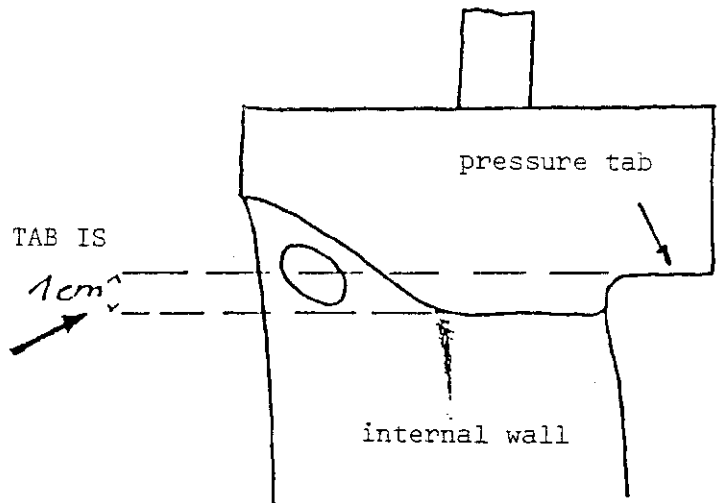


The level of the pressure tab
and
The level of the internal wall
ARE AT A RIGHT ANGLE

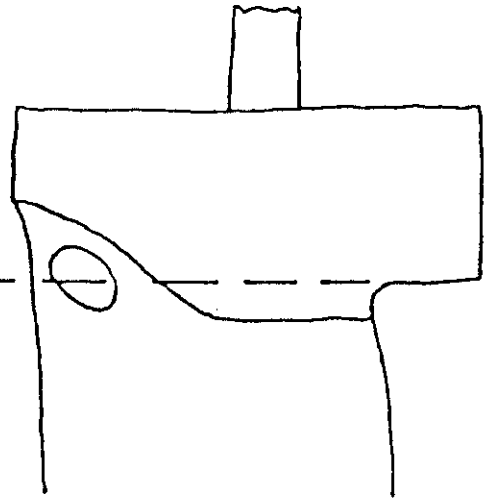


excavate the pressure tab to retrieve the
measurement of the internal wall taken earlier
(see p. 19)

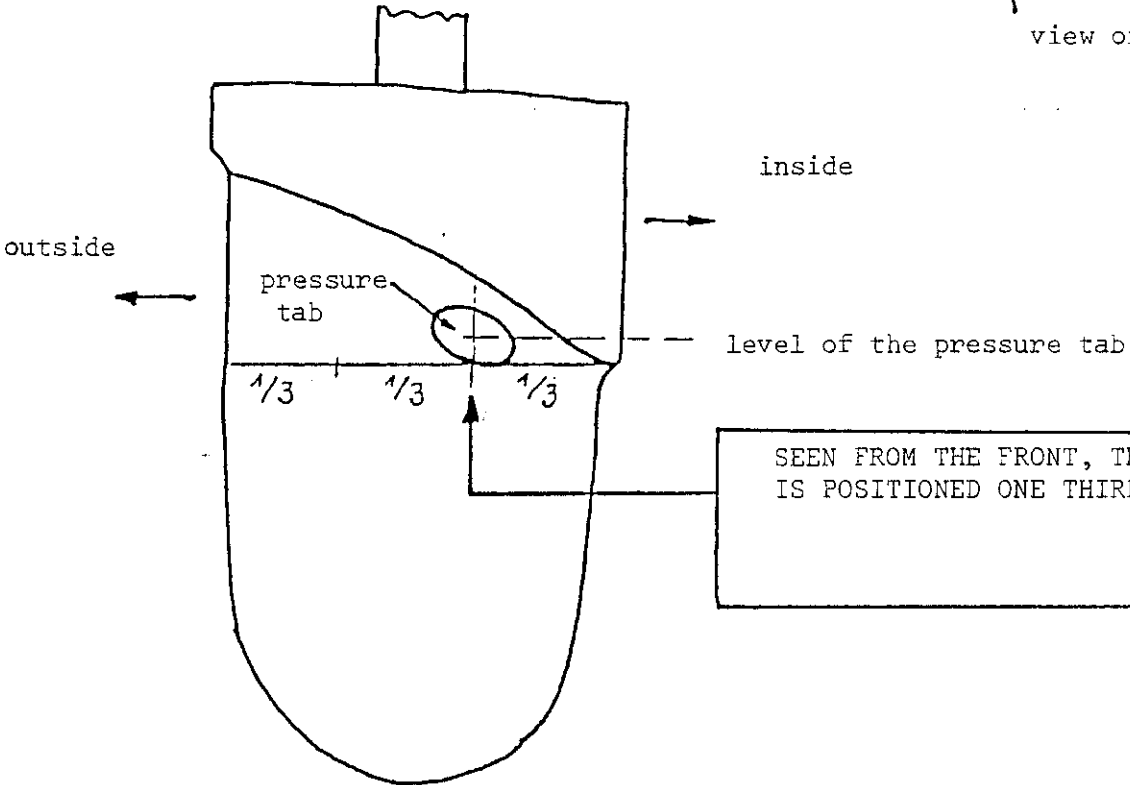
THE LEVEL OF THE PRESSURE TAB IS
1 CM ABOVE THE TOP OF
THE INTERNAL WALL



SEEN FROM INSIDE - THE POSITIVE HAVING BEEN TURNED VERTICALLY - THE COUNTER PRESSURE AND THE PRESSURE TAB ARE AT THE SAME LEVEL



view of interior

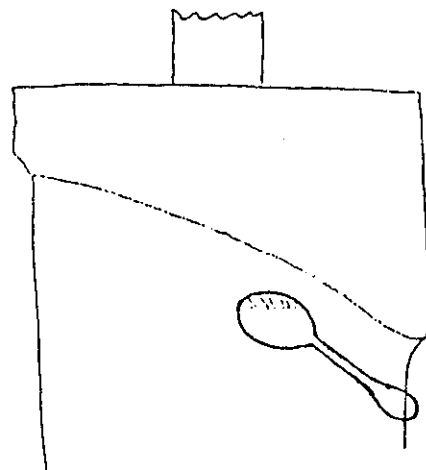
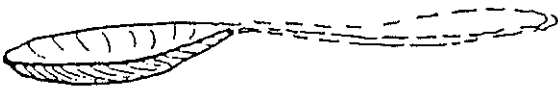


FRONT VIEW

SEEN FROM THE FRONT, THE COUNTER PRESSURE IS POSITIONED ONE THIRD INSIDE

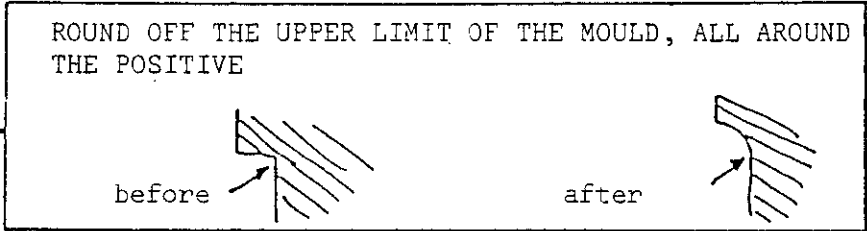
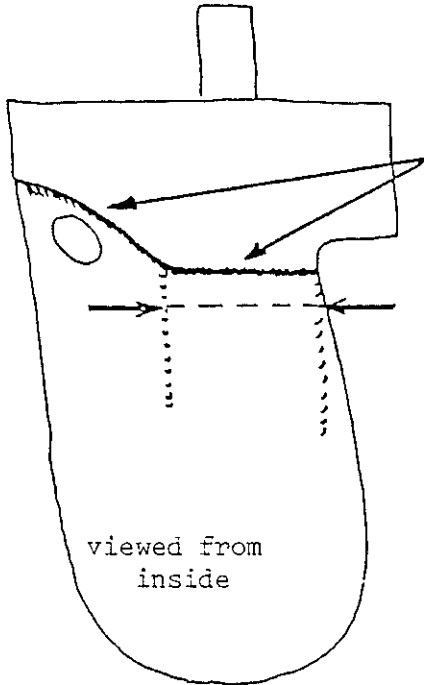
REMINDER: the counter pressure was marked by the thumb when the mould was under preparation

The counter pressure will resemble a spoon.



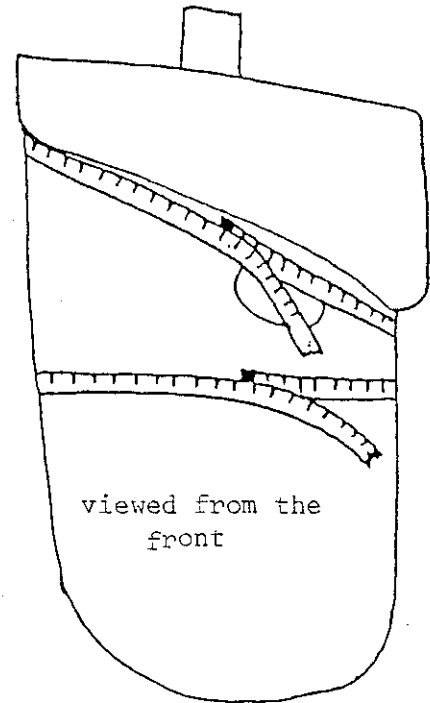
CONFIRMATORY MEASUREMENTS

Scrape the positive with wire mesh to obtain the measurements taken earlier on the amputee (see Chapter 2, p. 18)

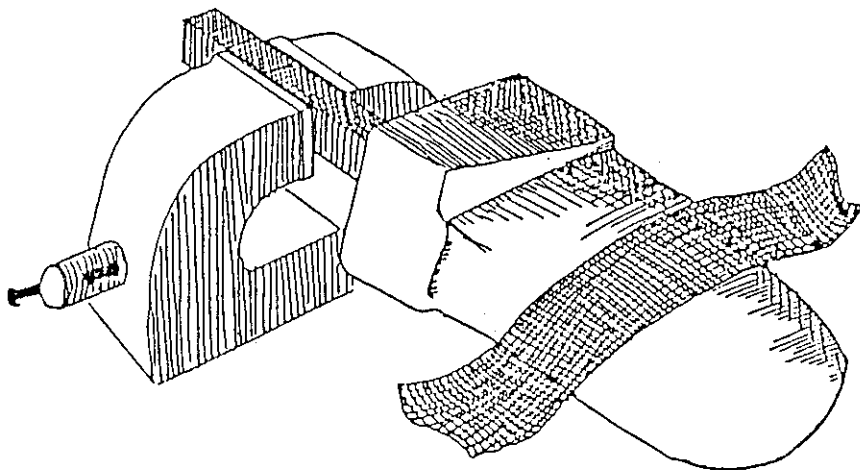


Retrieve the measurement taken of the width of the internal wall

Scrape the positive on the external wall and at the back to retrieve the measurements taken on the stump



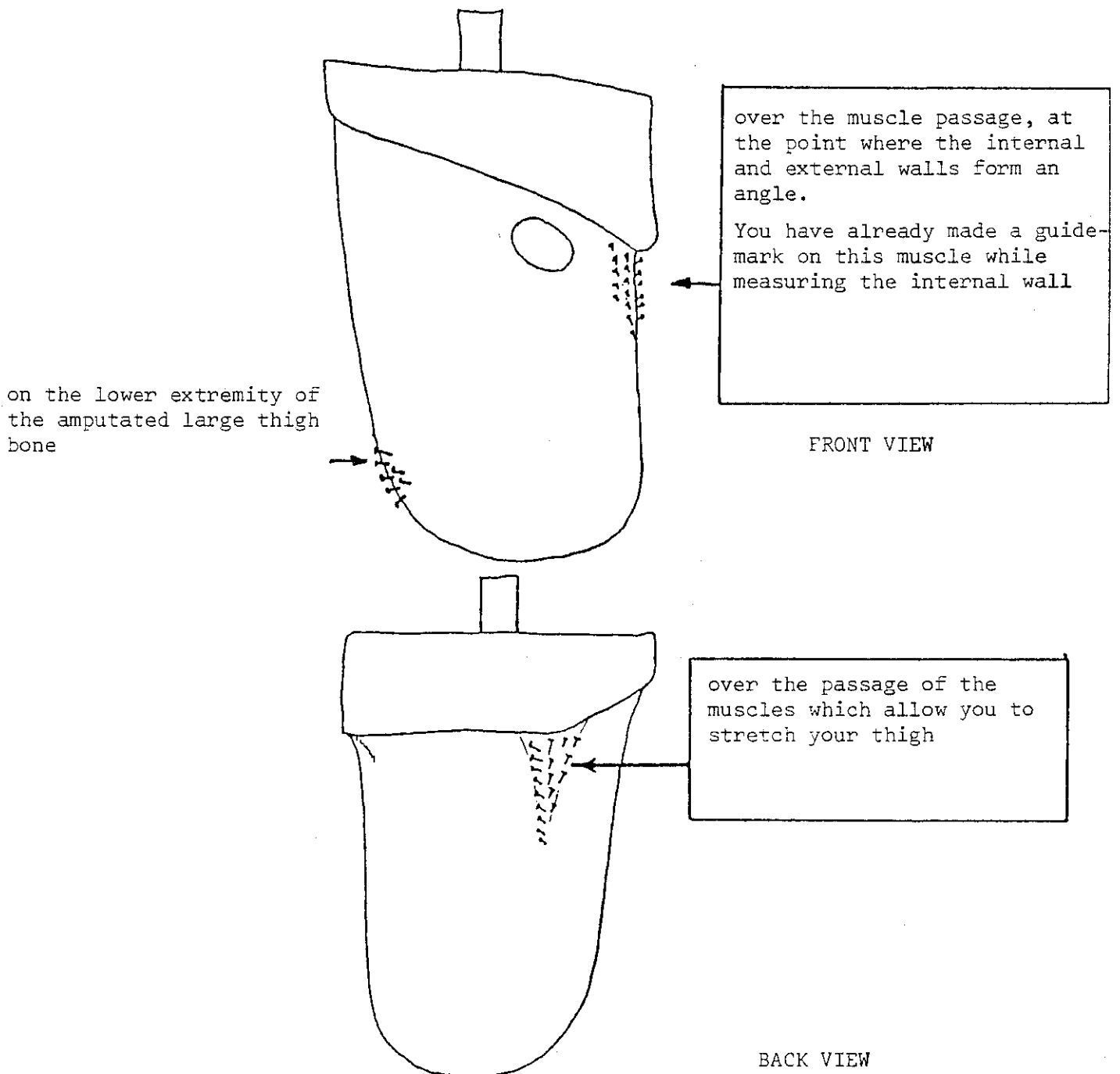
Even out the plaster with a strip of fine wire mesh.



these protect the sensitive zones
 they allow the muscles to perform properly while walking

In order that the plaster reinforcement adheres well to the positive, make out the positive and insert small nails, leaving a 2 mm gap in between each.

WHERE TO MAKE THE REINFORCEMENTS ?



TECHNICAL NOTE:

The water of the reinforcing plaster is rapidly absorbed by the positive and thus causes difficulties in manipulation, This may be remedied by preparing the plaster in a different way.

Put the plaster in powder form into the container and add water, crushing it on a piece of wood until such time as the powder is totally soaked. DO NOT STIR. Wait for the air bubbles to rise to the surface. Leave it to filter then tip out excess water. You will have a usable long-lasting plaster (it sets less quickly in the container) which will also be less brittle.

- . reinforce the designated areas with a small amount of plaster (this may be coloured)
- . scrape the reinforcing plaster until the heads of the nails can be seen. The reinforcements will each be around 2 mm apart

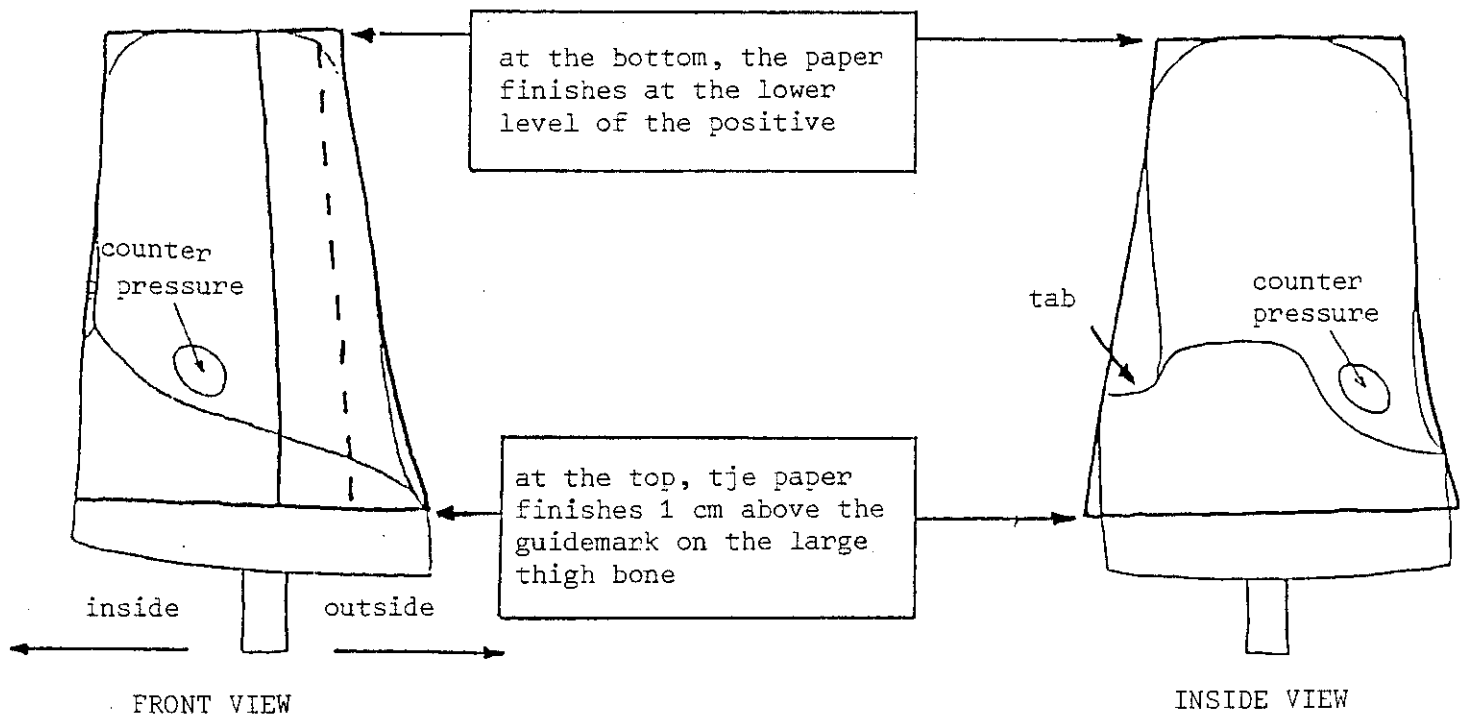
ALL THAT REMAINS TO BE DONE NOW IS TO SMOOTH THE PLASTER BEFORE RENDERING EVEN ALL SIDES OF THE POSITIVE.

CHAPTER 5 : THE LEATHER

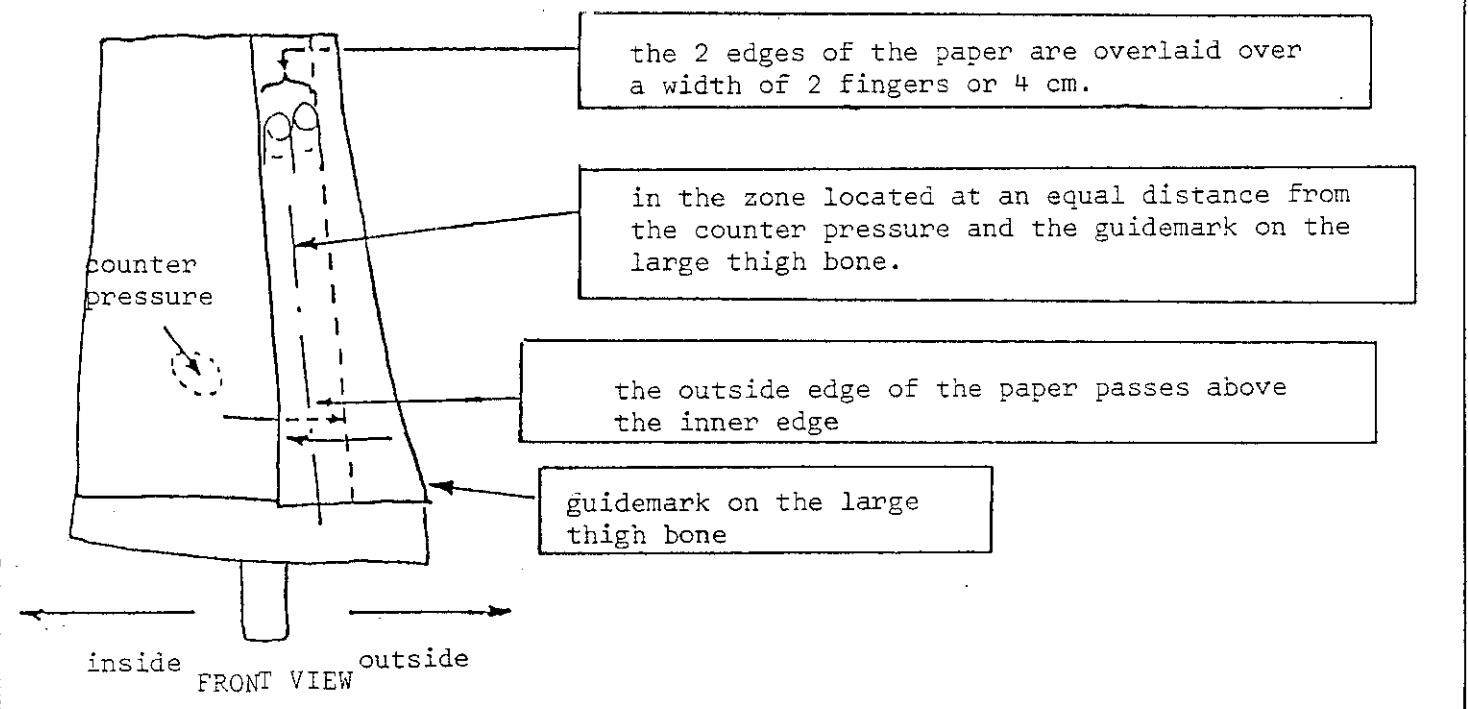
- the paper model
- the cutting of the leather
- shaping the leather
- closing up the leather
- stitching

THE PAPER MODEL

- Making a paper model will allow you to determine the shape of the leather which will be moulded onto the positive.
- The model must be AS PRECISE AS POSSIBLE, and well fastened on to the positive.
- Newspaper is ideal for this purpose.



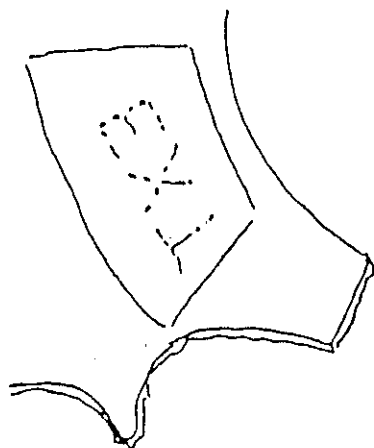
THE ZONE TO BE COVERED BY THE PAPER OVERLAY



THE CUTTING OF THE LEATHER

You must be able to recognise :

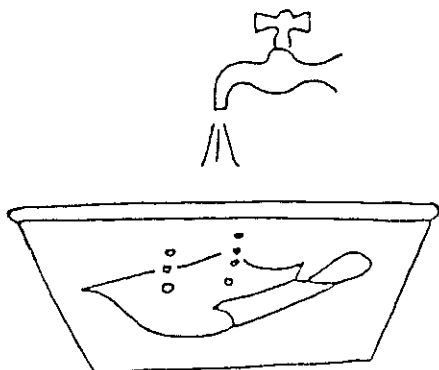
- the prime side of the leather (smooth and lustrous - the side previously covered with fur)
- the "fleshy" side of the leather (ruddy, matt - the underside where the muscles were located).



PLACE THE SIDE OF THE PAPER MARKED "EXT" ON THE SMOOTH SIDE OF THE LEATHER (THE PRIME SIDE). IN THIS WAY, THE SMOOTH SIDE OF THE LEATHER WILL BE AGAINST THE SKIN OF THE STUMP.

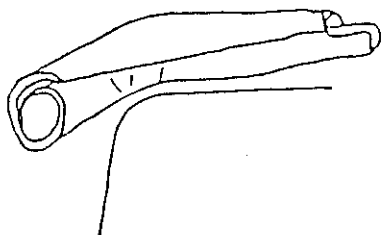
Mark out the contours of the paper on the leather

Cut out the leather

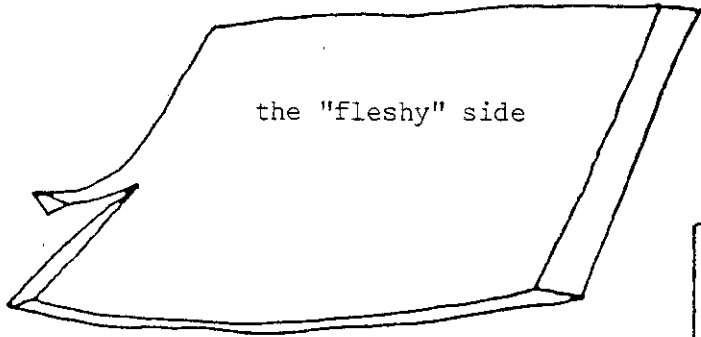


Soak the leather in water for several hours. This will soften it (warm water is more effective than cold water)

Handle the leather regularly and frequently while it is soaking in the water.



It is this handling, rather than the duration of soaking in the water, which will make the leather supple and thus easier to mould on the positive.



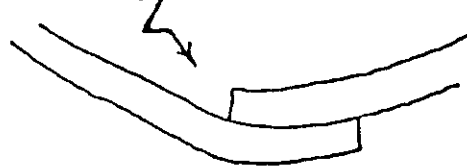
once the leather is well moistened, bevel the edges which are superimposed.

IMPORTANT! bevelling is done on the "fleshy" side of the leather

These bevels (on the smooth side) allow for the making of an overlay without "bumps" appearing inside the leather cast.



YES



NO

RISK OF PAIN OR CHAFING

TECHNICAL NOTE:

There are two ways to bevel the leather

ON DRY LEATHER
(before soaking)

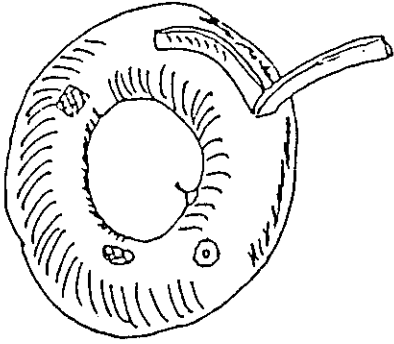
- Use a well sharpened plane.
- Clasp the edge of the leather to be bevelled between two wooden lathes, held in a vice.

ON MOIST LEATHER
(after soaking)

- Use a well sharpened paring knife.

SHAPING THE LEATHER

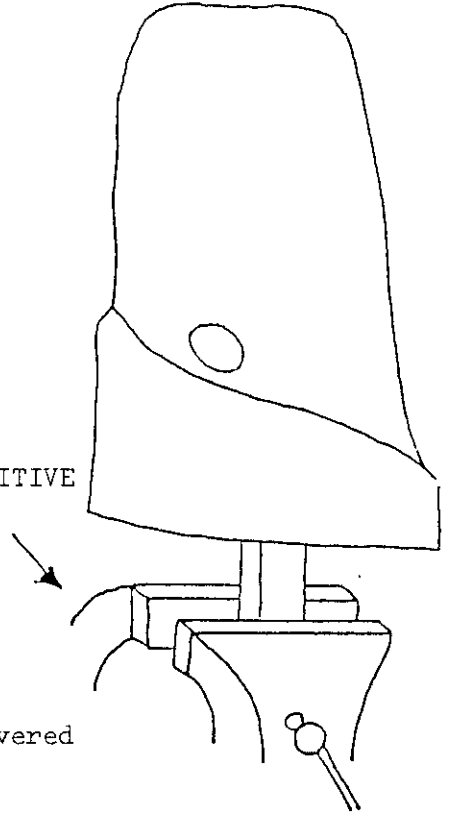
THIS PART OF THE WORK SHOULD BE CARRIED OUT BY TWO PEOPLE



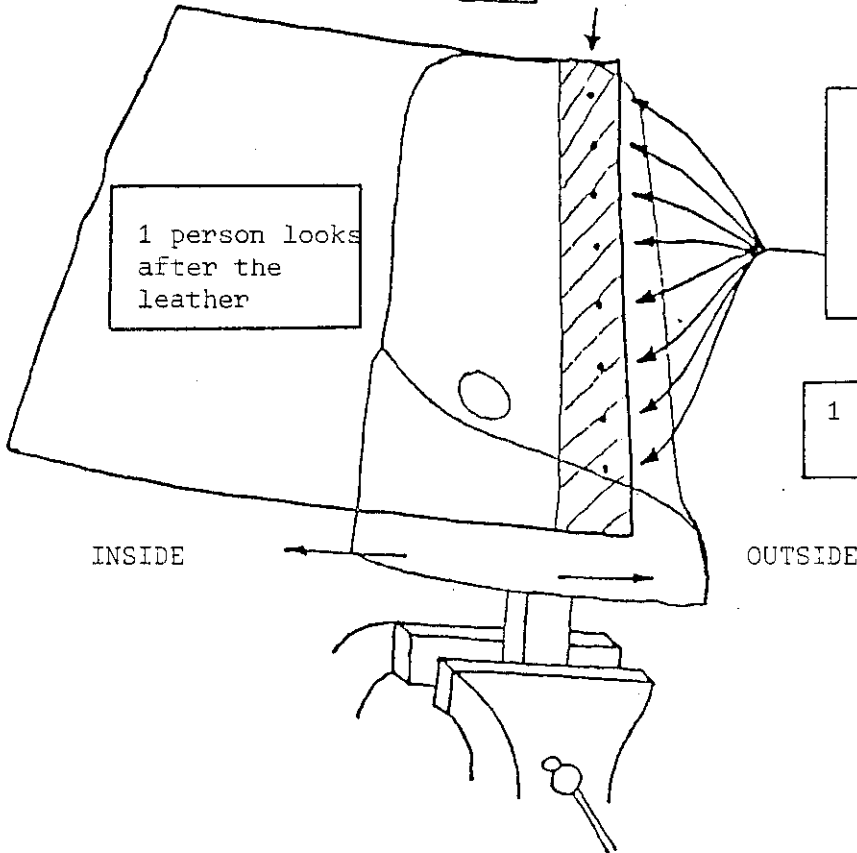
Cut out from the inner tube of a tyre, several strips each 4 cm to 6 cm in length

Place the supple leather (smooth side) against the positive

FIRMLY FIX THE POSITIVE IN THE VICE



area to be recovered



1 person looks after the leather

first, nail the bevelled side furthest away from the counter pressure

1 person nails

INSIDE

OUTSIDE

TO PUT THE LEATHER IN PLACE, PROCEED AS FOLLOWS

FIRST PERSON

SECOND PERSON

Stretch as hard as possible and roll it out over the positive, passing in succession:

- the counter pressure (2)
- the internal wall (3)
- the posterior wall (4)
- the external wall
- the area to be covered (6)

Rub the leather firmly with a bamboo stick or the handle of a tool so as to mould it well on the positive

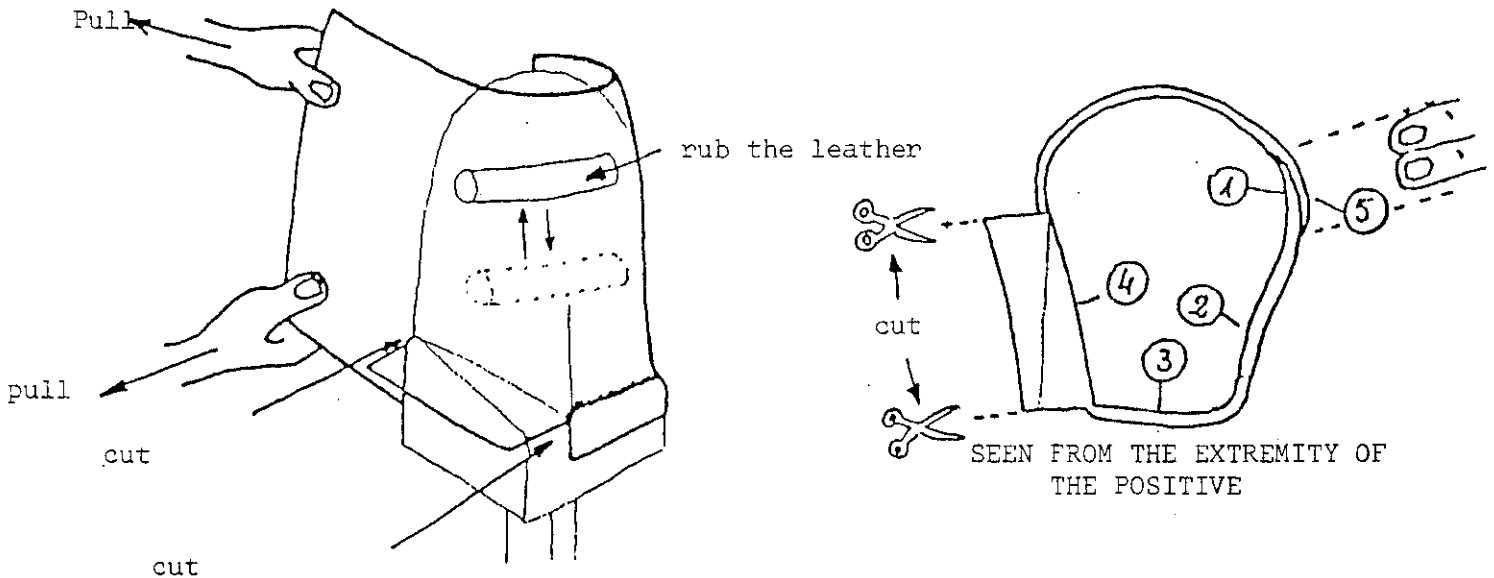
Particularly concentrate on the upper limit of the mould (see p. 36)
You should be able to see this limit on the leather



THERE SHOULD NOT BE ANY SPACE BETWEEN THE LEATHER AND THE POSITIVE

IMPORTANT NOTE:

At the beginning and at the end of the pressure tab, make incisions in the leather. This will allow for perfect moulding of the leather on the tab.



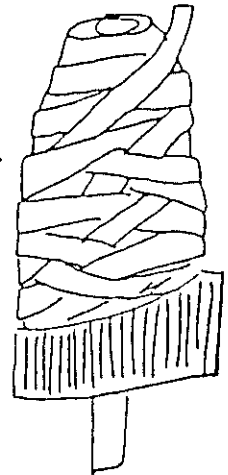
Finish the moulding of the leather by fixing the second bevelled edge with a few nails.
You should have an overlay area at least equal to the size of two fingers.

Place leather or materials cut offs inside the counter pressure and in the angle of the pressure tab.

Roll round the inner tyre strips, as tightly stretched as possible, to firmly hold the leather on to the positive

CAREFULLY MONITOR THE CORRECT POSITIONING OF THE LEATHER DURING THE PLACEMENT OF THE STRIPS - THE LEATHER TENDS TO SLIDE. IF THIS HAPPENS, REMOVE AND START THE PROCESS AGAIN.

- . Cover all the leather with the strips of tyre WITHOUT CLOSING THE EXTREMITY.
- . Remove the rubber tyre strips after 24 hours.
- . Leave the leather on the positive for a further 24 hours and smooth the leather with a bamboo stick or the handle of a tool.



CLOSING UP THE LEATHER

IMPORTANT !!!

This stage of fabrication, as well as the next stage (stitching), come in chronological order after the making of the upper strap (Chapter 9). These two stages appear in this chapter which is devoted to the preparation and working of the leather.

REMEMBER THIS WHEN TRAINING TECHNICIANS

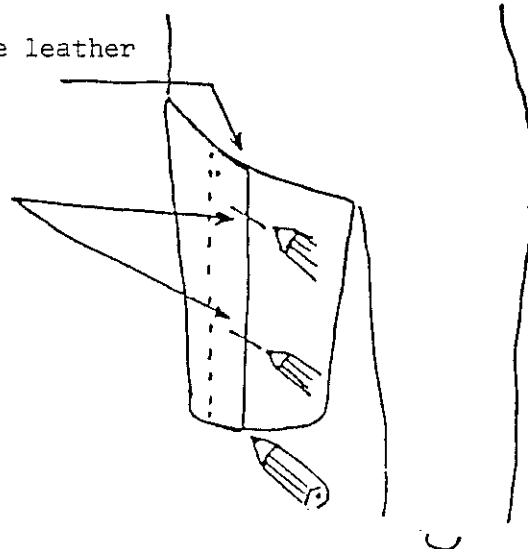
- . Remove the leather from the positive
- . Try the leather on the amputee's stump

CHECK: - that the position of the bone when seated on the pressure tab is satisfactory
- that the position of the counter pressure is correct.

THE AMPUTEE SHOULD FEEL COMFORTABLE AND AS THOUGH HE IS SEATED

- . Close the leather by pulling the complete length at regular intervals.

- . Check that the flesh is being being pinched by the leather
- . Trace the line of the overlay and both edges of the leather
- . Mark two or three harness-like traces on this line
- . These guidemarks will assist you to easily find the exact position of the securing points on the amputee
- . This work is more easily done by two people:
 - the first person ensures that the leather is in the correct position
 - the second person traces the guidemarks
- . Try out the closed leather on the amputee



As soon as the leather is correctly fixed (tissue and talcom powder), verify the correct cutting of

- the internal wall
- the anterior wall
- the external wall

To do this, ask the amputee

- to bring his stump towards his good leg
- to bend the stump forwards
- to stretch the stump outwards

STITCHING

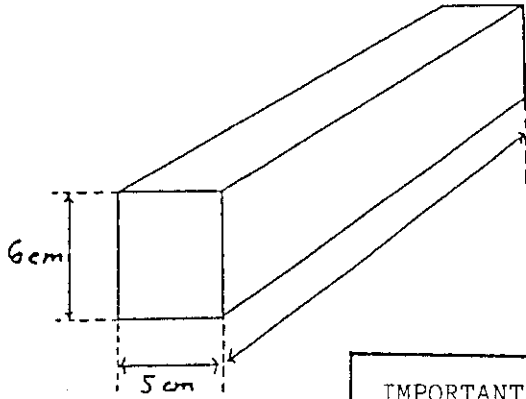
- . The stitching can be found in the middle of the recovered zones of the edges of the leather
- . The techniques employed in stitching are described in the Annex of this Manual
- . The final fastenings of the leather will be done with sample bolts. The leather will be stitched only when fabrication is complete, just before delivery of the prosthesis.

CHAPTER 6 : THE PEG AND THE UPRIGHTS

- measuring the peg
- measuring the uprights

MEASURING THE PEG

- The peg and the prosthesis replace the whole of the amputated leg, including the knee (see Chapter 8 for explanations of the knee).
- The peg should be made of semi-hard wood, which should be of good quality and DRY.



The cross section of the wood measures 6 cm x 5 cm and forms a perfect right angle.

IMPORTANT: Calculation of measurements of the peg is also done while the patient is bare foot.

P = length of the peg

J = length of the leg (ground to below the kneecap)

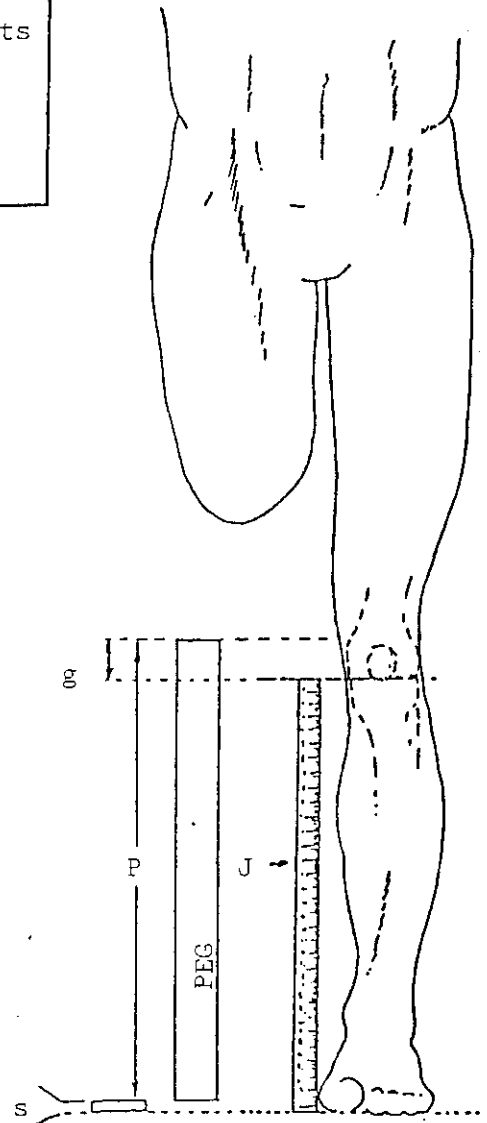
g = height of the mechanical knee = 5 cm

s = thickness of the sole of the prosthetic foot = 1 cm

therefore: $P = J + g - s$

which is: $P = J = 4$ cm

REMARK: do not confuse the sole of the prosthetic foot with the sole of the shoe



MEASURING THE UPRIGHTS

- . The uprights are of laminated steel (preferably inoydable), 2.5 cm in width (one thumb) and 3 mm thick (1/8 of a thumb)
- . Uprights are of different lengths: thus it is easy to differentiate between them.

C = length of the thigh (from below the "sitting bone" to below the kneecap)

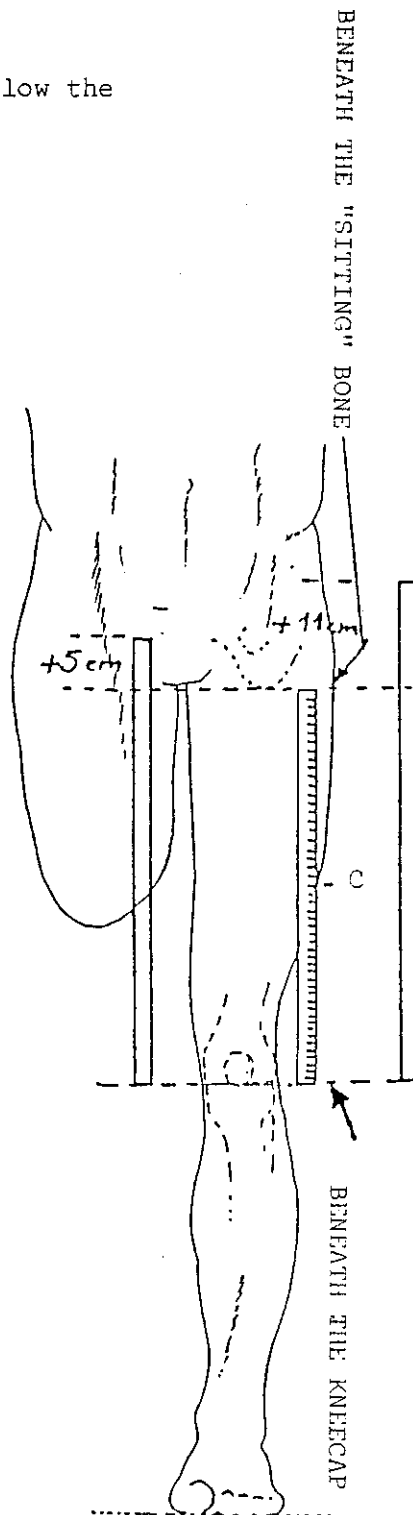
<ul style="list-style-type: none">. INTERNAL UPRIGHT = C + 5 cm. EXTERNAL UPRIGHT = C + 11 cm
--

Note: these constants of 5 cm and 11 cm include:

- the margin of the fold
- the knee
- the bolt of the knee

- . NB: The value of these constants may be modified depending on the size of the stump.

In a case where you are mounting the prosthesis on a dry peg, refer to Chapter 7, page 50, for explanations of the lengths of the uprights.



* THIS CHAPTER IS TOTALLY INTERCHANGEABLE WITH
CHAPTER 8 (THE KNEE)

CHAPTER 7 : THE "DRY" PEG

- advantages of this technique
- measuring the uprights
- measuring the peg
- fixing the uprights/peg

ADVANTAGES OF THIS TECHNIQUE

o This technique of using a "dry" peg, without articulation of the knee has the advantages of :

- a far simpler means of production for the technician
- a satisfactory functional result for the patient

The simple means of production is indicated if:

- the conditions for training are precarious
- limited time is available for training
- supervision is difficult
- the technicians are at a low technical level

A satisfactory functional result is indicated if:

- the patient tires easily, has minimal opportunities to walk
- the patient has a stump of low mobility and/or low tonicity
- the patient lives in a difficult environment (steep gradients, uneven land, slippery ground)

VERY IMPORTANT: DO NOT ATTACH THE FOOT TO THE PEG WHILE THERE IS NO ARTICULATED KNEE.

MEASURING THE UPRIGHTS:

Internal upright = C + 6 cm

External upright = C + 12 cm

These constants of 6 cm and 12 cm include

- the margin of the fold
- the fixing of the uprights on the foot

NOTE: The value of these constants may be modified depending on the size of the stump.

MEASURING THE PEG:

- see Chapter 6 ----> P = J = 4 cm

FIXING THE UPRIGHTS/PEG

Follow the exact sequence of production of the tibial prosthesis
(Fixing with 2 bolts and 2 screws 8 mm in diameter)

TOTAL LENGTH OF THE PROSTHESIS

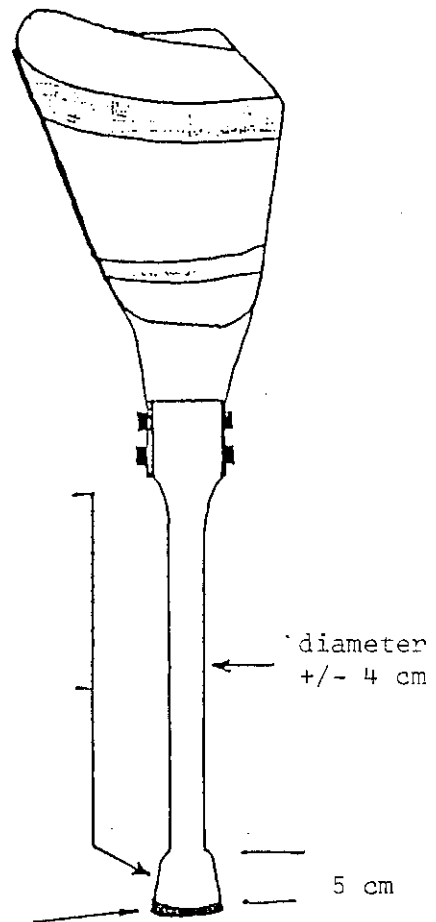
A prosthesis with a dry peg should be shorter by 1 cm than the valid site,
so as to allow easier gair.

FINISHING:

the peg may be rounded
using either a rasp or
a wheel

Keep the maximum diameter below the
peg at a distance of around 5 cm
("elephant foot")

rubber pad



CHAPTER 8 : THE KNEE

- the "U" of the abutment
- fixing on the uprights
- the consolidating "U"
- the top of the peg
- the tenon of the peg

the uprights

the consolidating "U"

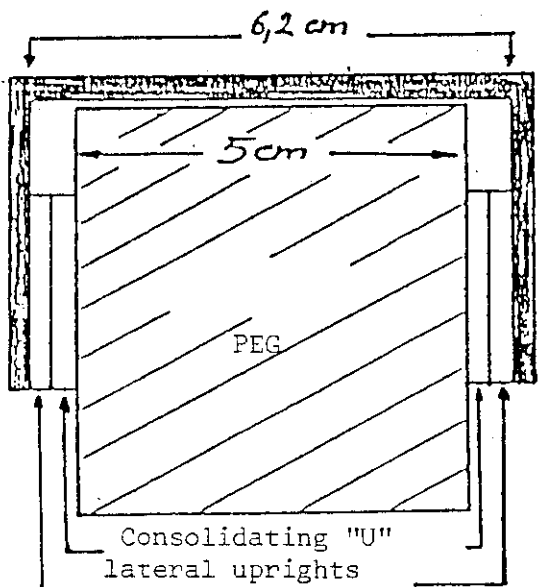
the "U" of the abutment

axis of the knee

flattened rubber pad

bolt of the knee

peg



The space between the two interior branches of the "U" of the abutment measures 6.2 cm

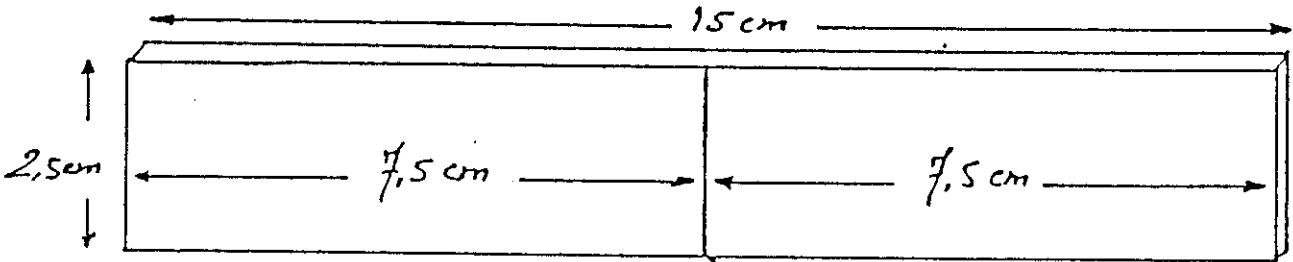
This permits "framing" of the peg (5 cm), the two sides of the consolidating "U" (0.6 cm) and the 2 uprights (0.6 cm)

$$5 \text{ cm} + 0.6 \text{ cm} + 0.6 \text{ cm} = 6.2 \text{ cm}$$

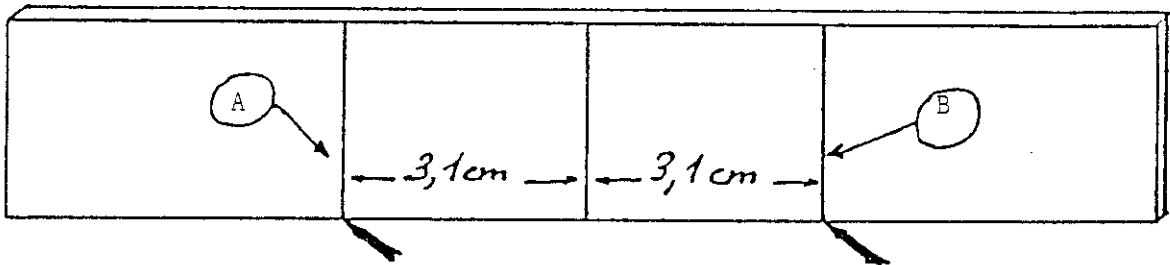
VIEW FROM ABOVE

THE "U" OF THE ABUTMENT

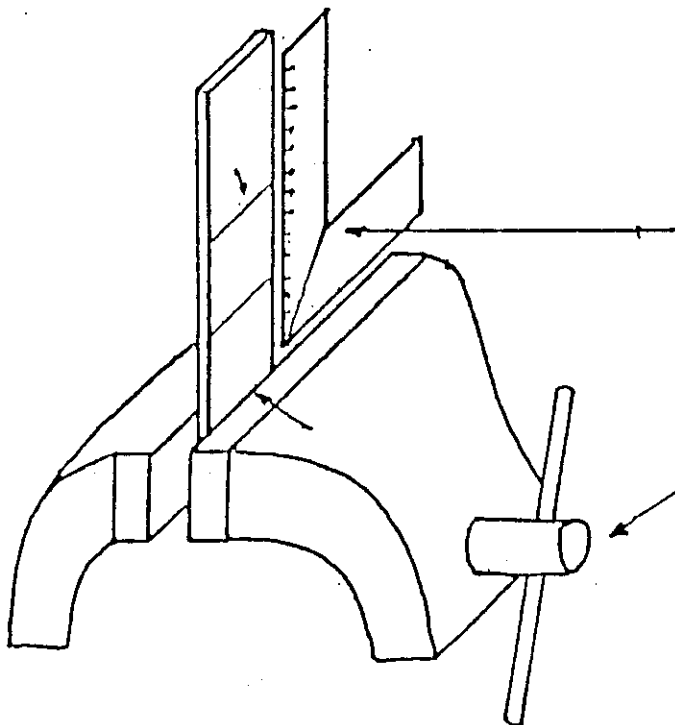
cut a piece of the upright measuring 15 cm



At the midpoint of the length, trace a perpendicular line on the edge of the upright



Trace two other lines, parallel to the first part and the other at 3.1 cm

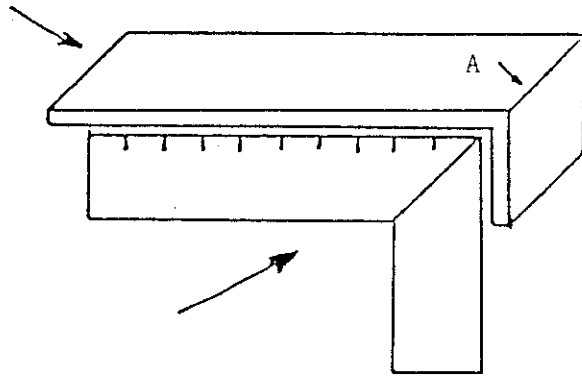


the piece of the upright will be folded in accordance with lines A and B

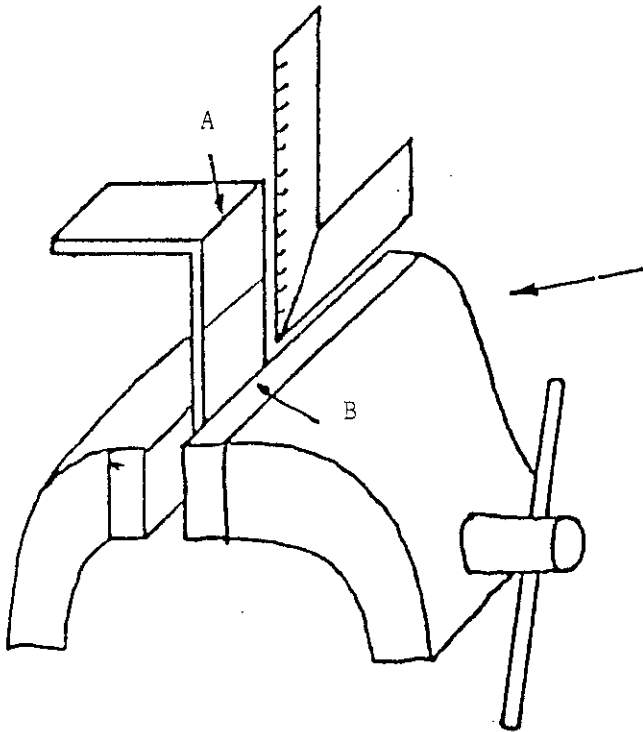
Check with the aid of an angle that the upright is perpendicular to the sides of the vice.

Squeeze the upright in the vice, placing Line A at the brim of the vice.

fold the upright



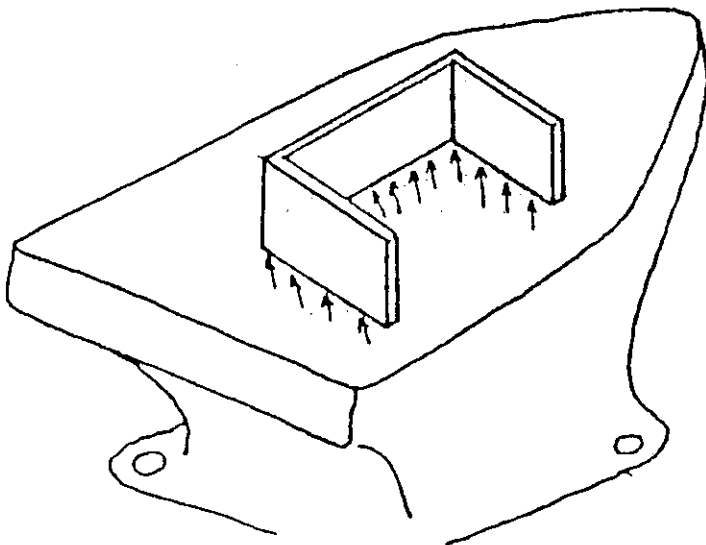
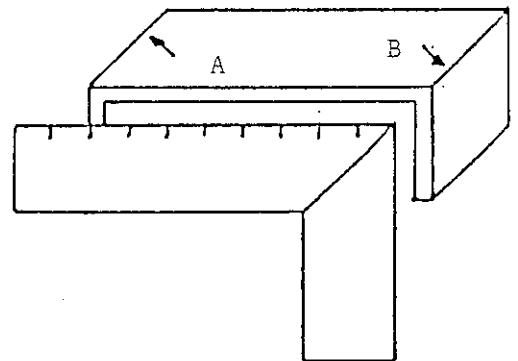
and check that the position is a true right angle



Repeat for B the same procedure as for A

. Fold the upright

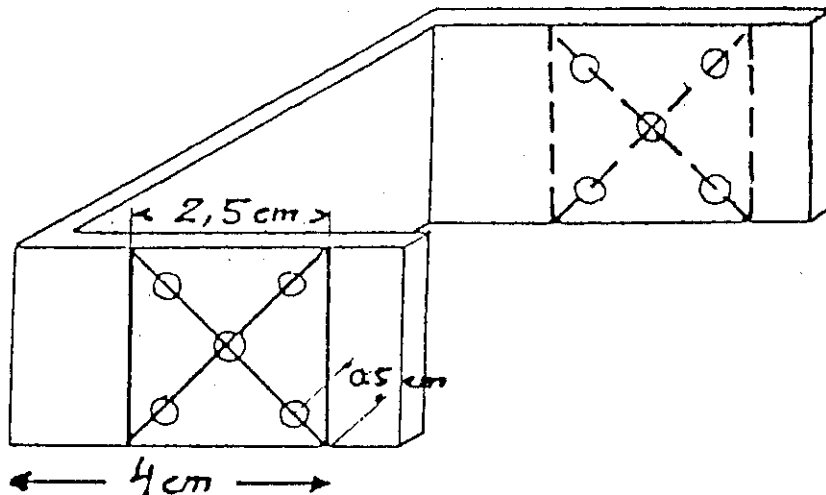
. Verify that it is a true right angle



On a flat surface, for example on an anvil, verify that the "U" is straight.

THE SIDE OF THE "U" SHOULD BE EVEN AT ALL POINTS

- . Trace a line on each branch at a distance of 4 cm from the side before the "U"
- . Trace a second line, parallel to the first, at a distance of 2.5 cm from the first



- . Trace the diagonals
- . Mark the point of intersection of the diagonals and pierce a hole measuring 4 mm; this is the location of the axis of the knee.
- .. At a distance of 0.5 cm from the extremities of the diagonals, mark and pierce 4 holes each 4mm in size.

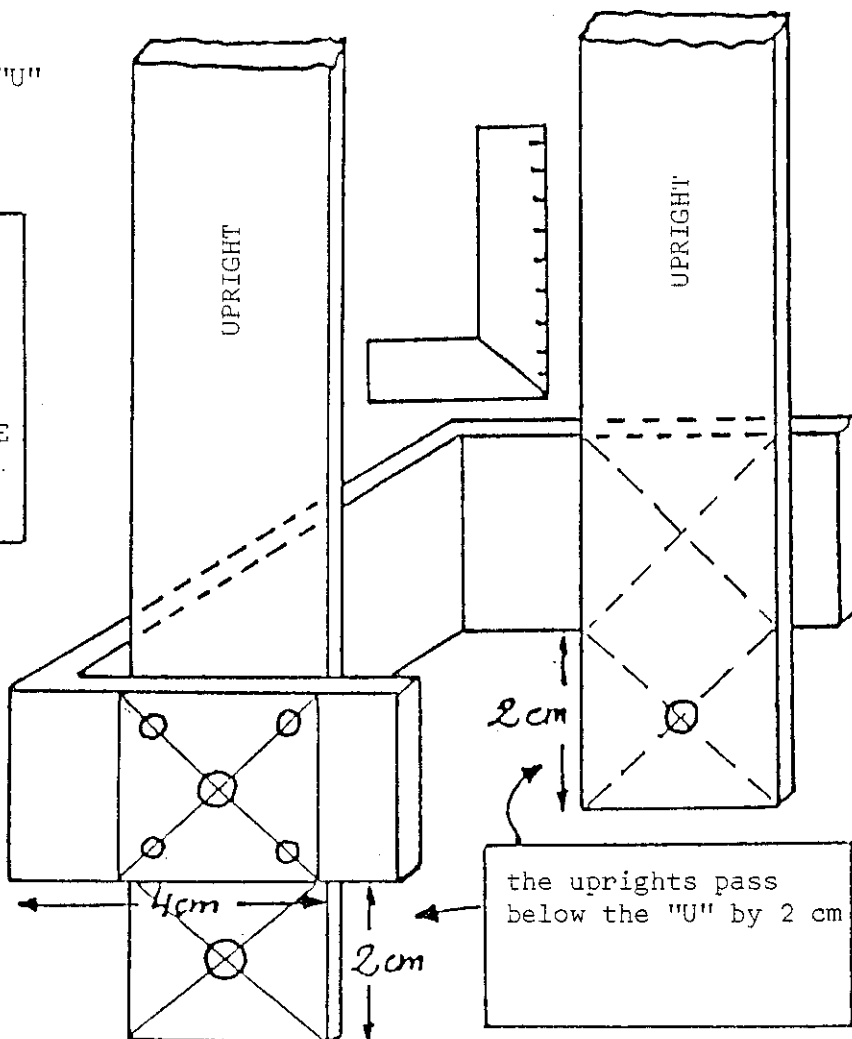
FIXING ON THE UPRIGHTS

- . The uprights will be placed and affixed in the interior of the "U" as shown in the diagram.

THE UPRIGHTS ARE:

- PERPENDICULAR TO THE "U"
- PARALLEL AND SUPERIMPOSED WHEN THE KNEE IS LOOKED AT IN PROFILE

CAUTION:
THE LONGER UPRIGHT IS ON THE EXTERNAL SIDE OF THE PROSTHESIS.

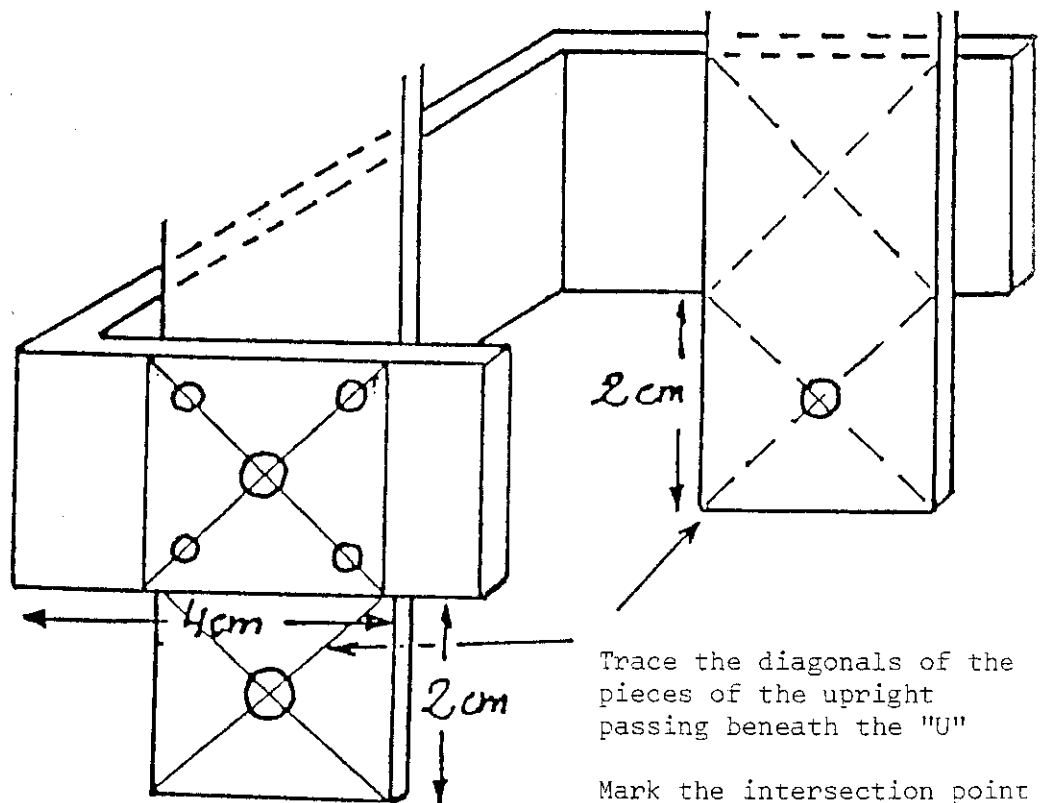


PLACE THE FIRST UPRIGHT IN A PROPER POSITION ON THE BRANCH OF THE "U", WITH THE AID OF A VICE.

Pierce the upright at 4 mm. Use as a guide, the holes in the "U"

TECHNICAL NOTE: Place a sample bolt measuring 4 mm in the assembly as soon as the hole has been made. By doing this, you will be able to alter the placement of the vice, without modifying the setting.

Follow the same technique for the second upright.



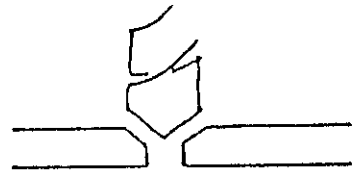
Trace the diagonals of the pieces of the upright passing beneath the "U"

Mark the intersection point of the diagonals.

Pierce at 4 mm: this is the position of the bolt of the knee

FOR THE TECHNIQUES OF PIERCING, PLEASE REFER TO THE TECHNICAL NOTE IN ANNEX 1.

Enlarge all the holes in the uprights on the inside using a 8 mm borer (do not enlarge the holes made for the axis and bolt of the knee)



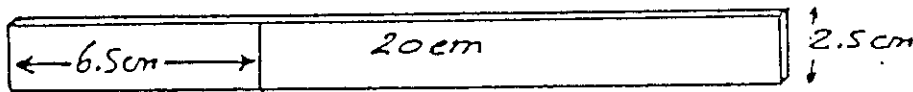
CAUTION: ONLY ENLARGE AT MIDDLE THICKNESS

- . Fix rivets, enlarged inside and capped on the outside.
- . File the heads of the enlarged rivets, so that they do not surpass the surface of the uprights,
- . Saw the edges of the "U" which are behind the uprights.



THE CONSOLIDATING "U"

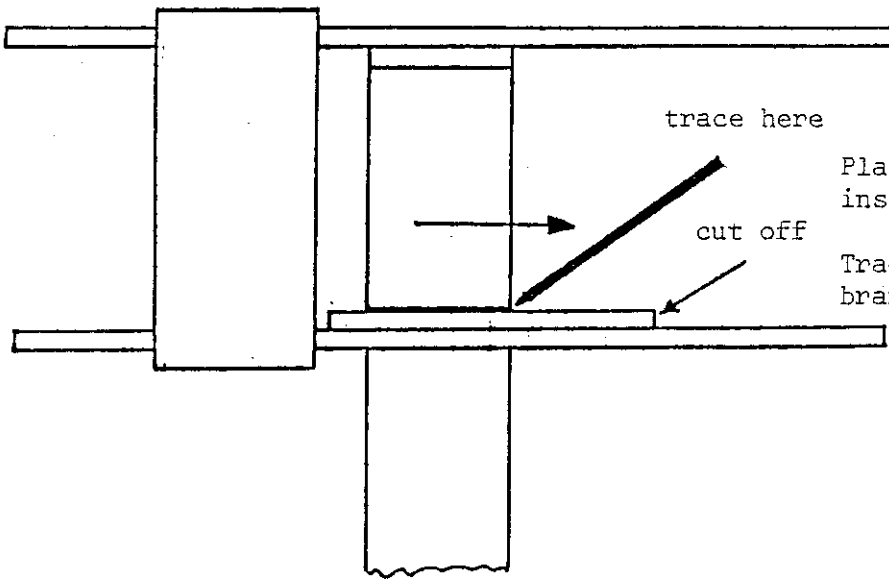
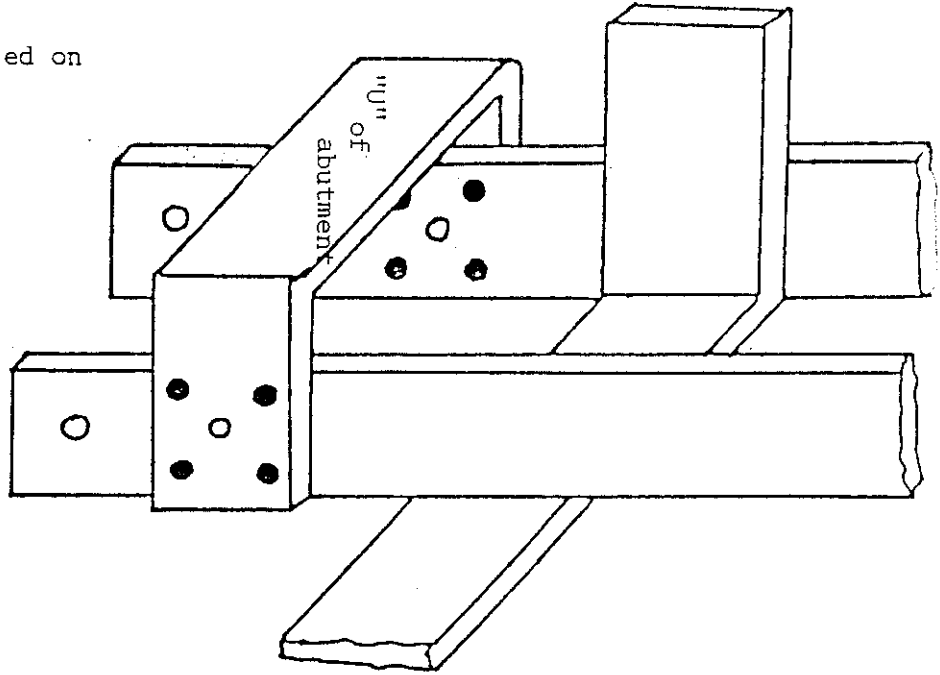
- . This piece consolidates the knee and constitutes the abutment of the flexion of the knee
- . Cut a piece of upright measuring 20 cm



At 6.5 cm from one extremity, trace a perpendicular line on the edge of the upright.
 As with the "U" of the abutment, only fold along the line of the piece of the upright.

CHECK THE RIGHT ANGLE IS TRUE

. Position the wood as indicated on the sketch.

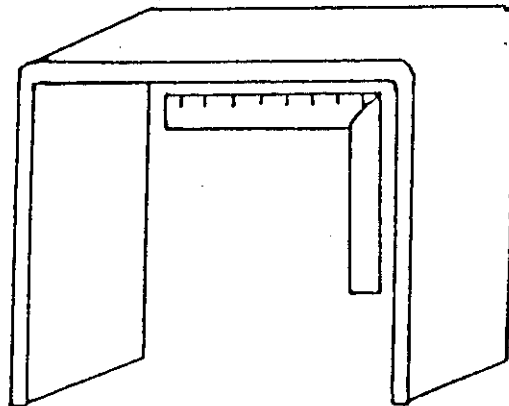


Place a cut off from the upright inside the uprights

Trace the folding line of the second branch of the consolidating "U"

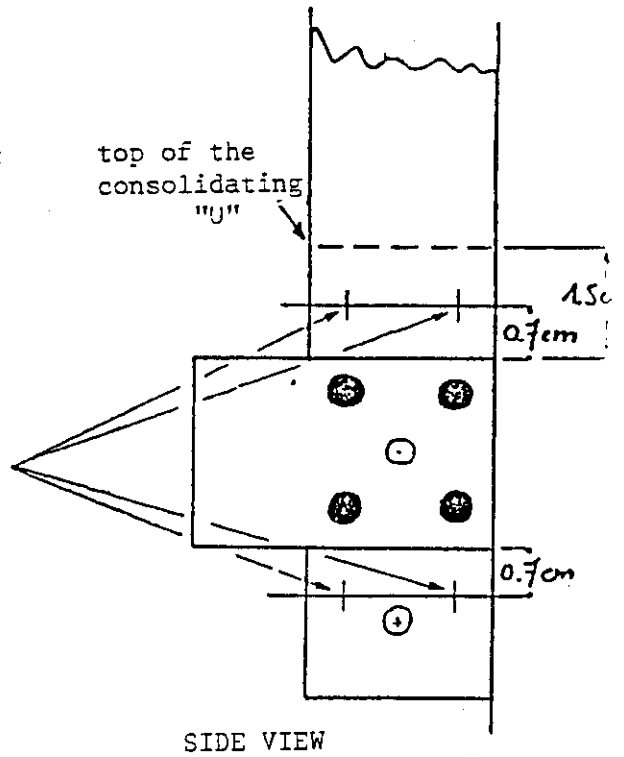
. As for the "U" of the abutment, fold the second branch

. Check the angle



- . Place the consolidating "U" inside the uprights
- . Its base is 1.5 cm below the "U" of the abutment
- . Fix the "U" with pliers
- . Mark and pierce at 4 mm, four holes for fixing the consolidating "U"

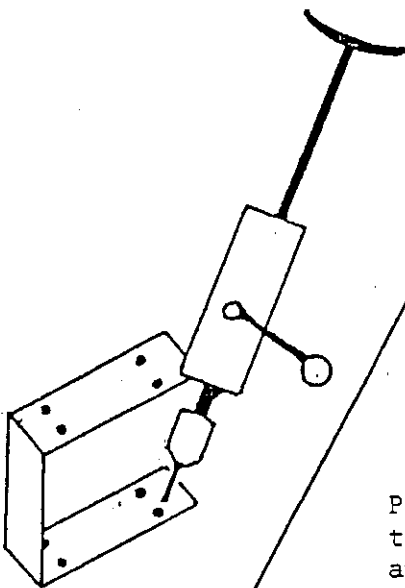
- . Take down the "U" and enlarge the holes using an 8 mm borer on the interior sides



- . Rivet the "U" (see page 59)
- . File the heads of the enlarged rivets

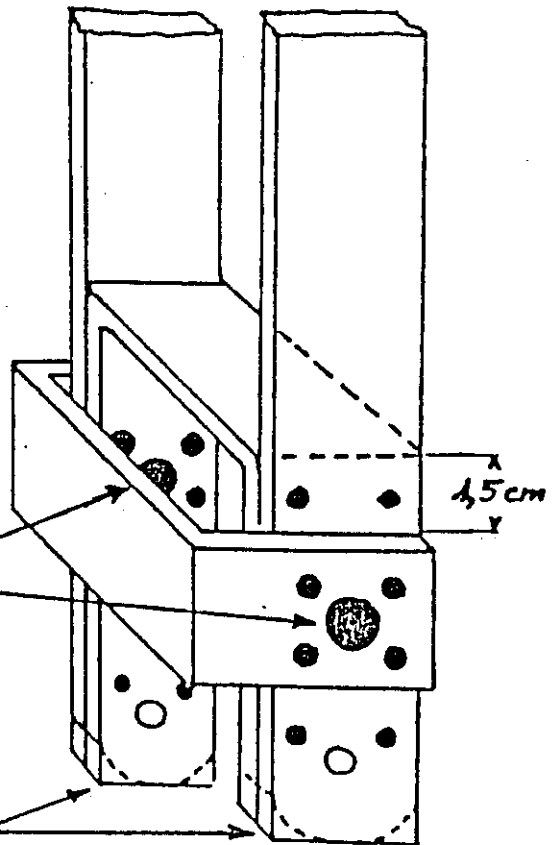
TECHNICAL NOTE

USE A HAND DRILL TO ENLARGE THE HOLES ON THE INSIDE OF THE "U"



Pierce the hole of the axis of the knee at 8 mm

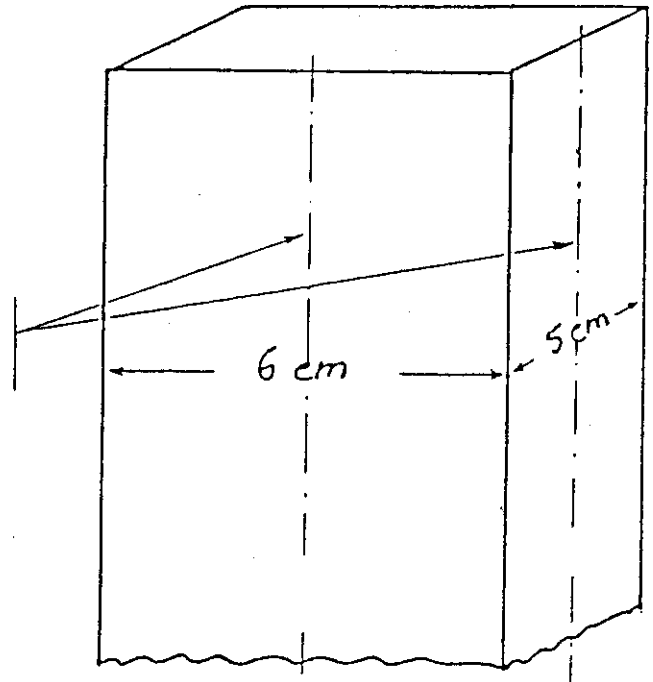
Round off the extremities of the uprights using a file.



THE TOP OF THE PEG

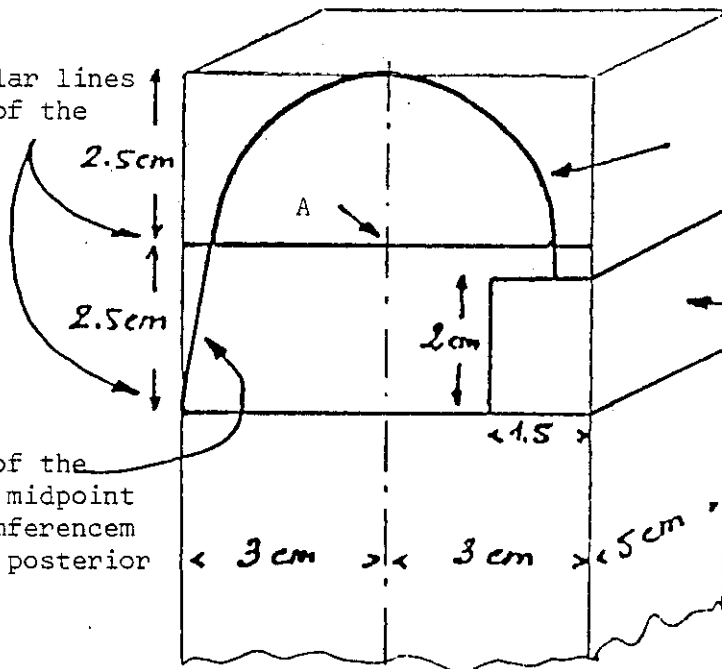
This a piece of wood, perfectly right-angled, measuring 6 cm x 5 cm

Trace the axes in the middle of each of the four sides



Trace on both sides of the peg

2 perpendicular lines on the edge of the peg



A half circle of 2.5 cm of the radius, where the centre is "A"

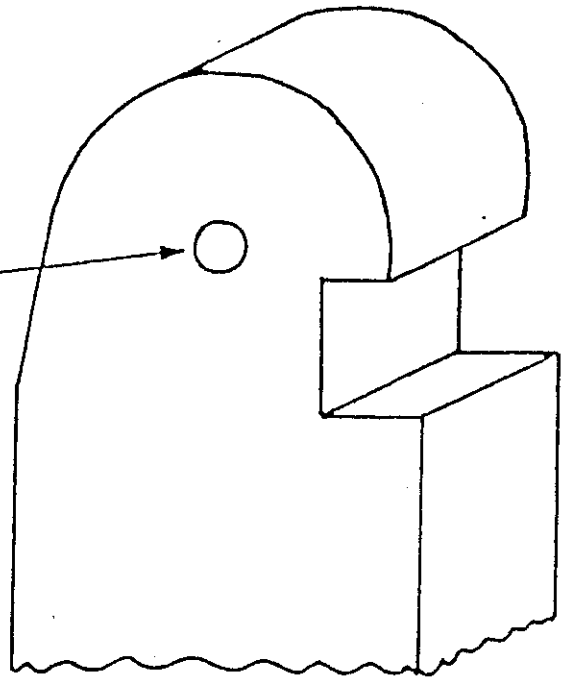
placement of a rubber cap

At the back of the peg and from midpoint of the circumference retrieve the posterior side at 5 cm

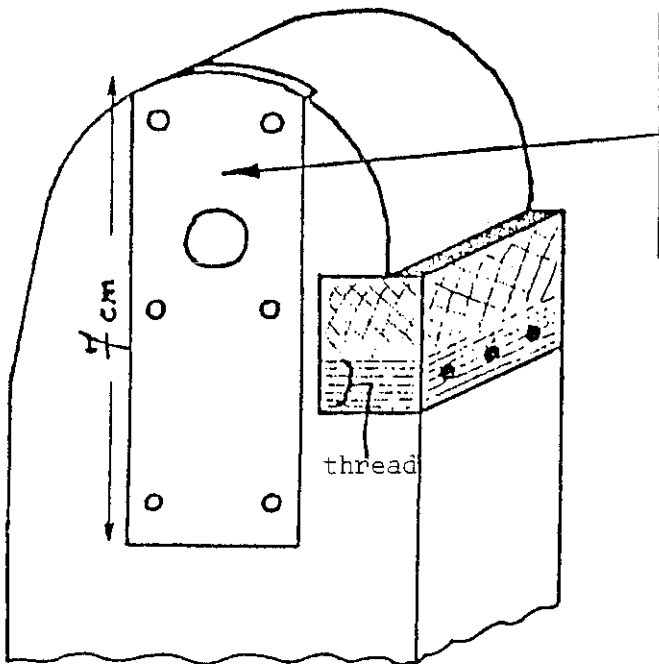
. Following the tracing line, cut a piece of wood.

. Pierce a hole of 8 mm, centered on the point "A" (axis of the knee)

When piercing, bore at mid depth (2.5 cm) then turn the peg round and finish boring from this other side. (this method lessens the risks of faulty turning of the axis)



Now adjust correctly the peg in the metal knee



With a wooden cutter, make notches on each side of the peg, a piece of upright measuring 7 cm

(These metal pieces will prevent the holes from becoming oval - a result of rubbing while walking).

Bore 6 holes, each 3 mm

Enlarge these holes to place inside the fixing nails.

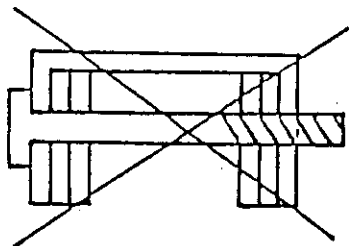
Check that the heads of the nails are not over the surface of the upright.

Wedge a piece of rubber in the notch and affix it with 3 nails in the thread of the rubber/

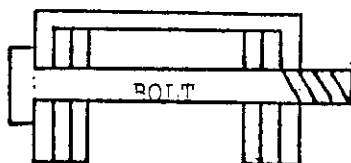
Assemble the peg and the articulating piece with a bolt 8 mm in diameter and 8 cm in length.

IMPORTANT:

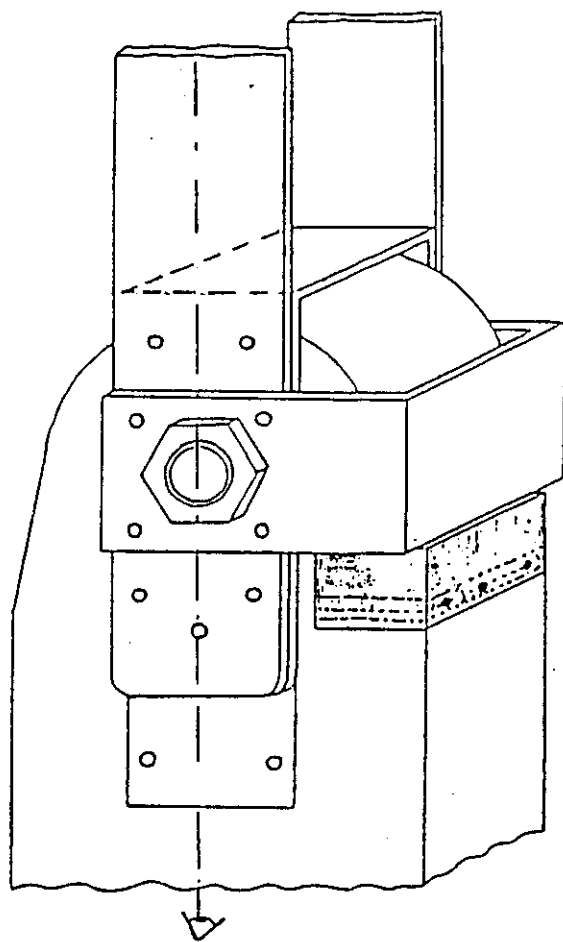
The bolt of the axis of 8 mm diameter should have a unthreaded shaft sufficiently long to prevent the threads from resting on the uprights.



NO
the axis will have
too much "play"



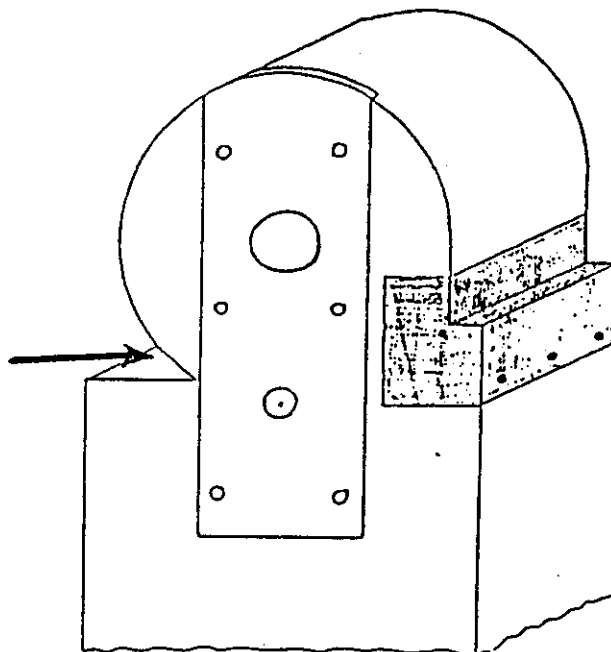
YES
No "play"



- . without exerting any pressure, cut the rubber cap so as to allow for perfect alignment between the middle of the uprights and the middle of the peg.
- CHECK BY LOOKING

At the back of peg, follow the tracing of the circle until you arrive at the piece of the notched upright.

Cut the back of the peg along the tracing. You will thus have a notch which allows adequate flexion of the knee (135°)



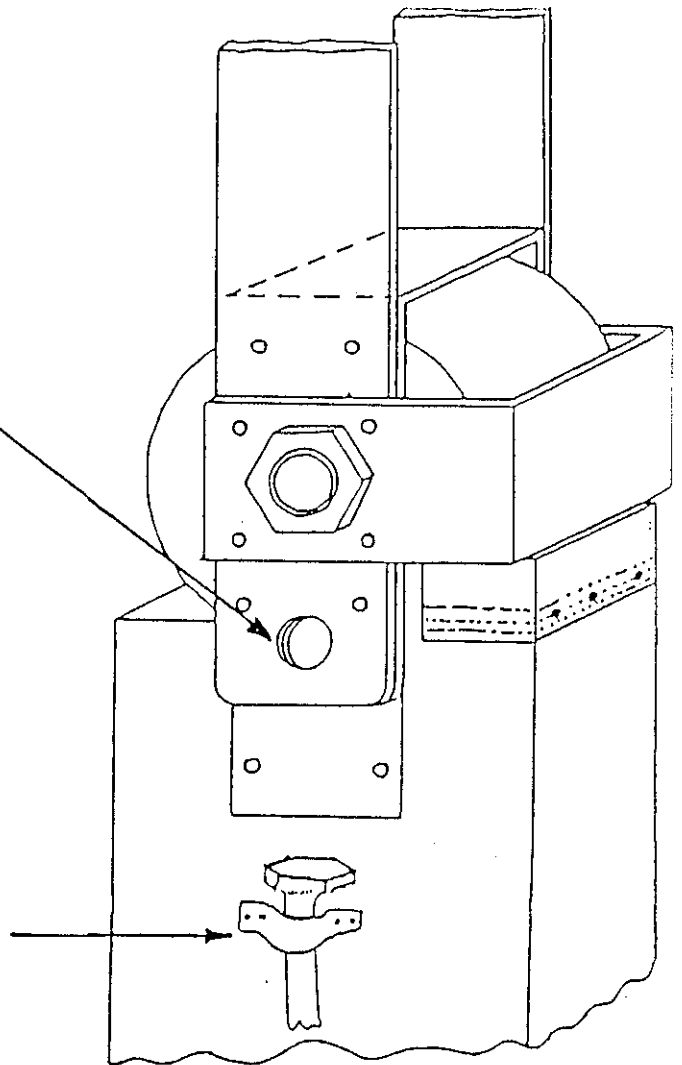
- . Remove the knee and verify that it bends without any "play", that there is no excessive rubbing and that there is ample space.

Align perfectly the middle of the peg and the middle of the uprights.

Drill at 8 mm a hole for the bolt of the knee

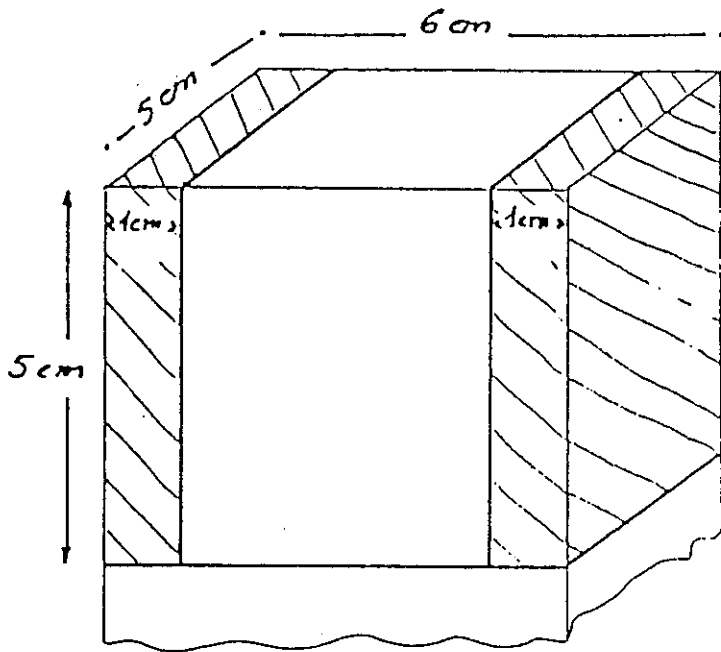
The bolt will be made with a special pin, 8 mm in size, which resembles the pin used for the axis of the knee.

Prepare a leather ring nailed to the external side of the peg. This ring will hold the pin of the bolt when the amputee is walking with a free knee



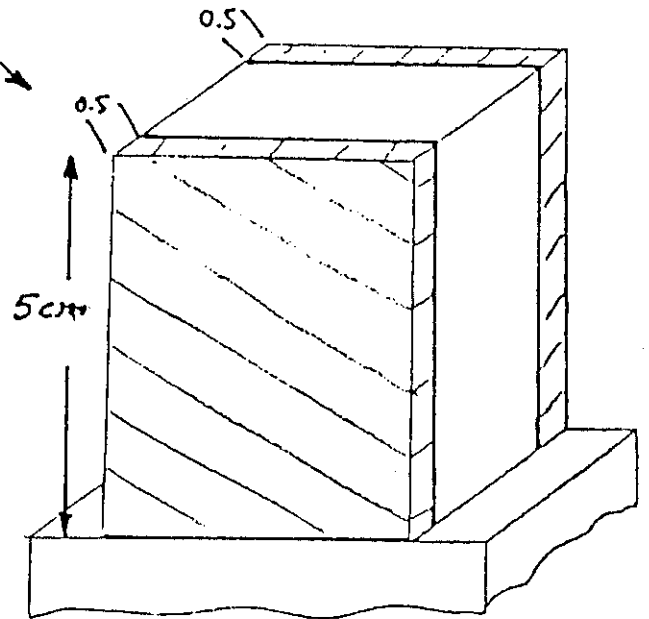
THE TENON OF THE PEG

- . You will make the tenon when the height of the prosthesis has been tried on the patient.
- . Fabrication of the tenon is described chronologically after the fabrication of the foot (Chapter 11, page 79)
- . The tenon has a diameter of 4 cm and is 5 cm high
- . Follow the steps as indicated, when the length of the peg has been finally determined.

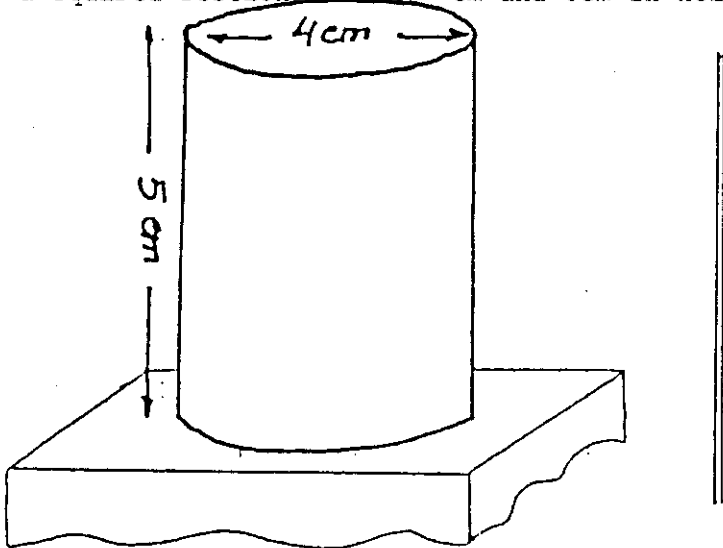


Trace two arrows on the sides of the peg, 0.5 cm from the edges, at a height of 5 cm.

. Saw the chopped pieces.



You will thus have a tenon with a squared section 4 cm x 4 cm and 5cm in height



Using a file and special wood cutter, round off the angles to obtain a tenon 4 cm in diameter

THIS TENON SHOULD BE ADJUSTED TO THE HOLE OF THE FOOT.

IT SHOULD BE FIXED INTO PLACE BY APPLYING MINIMAL PRESSURE AND SHOULD BE HAMMERED.

CHAPTER 9 : THE UPPER STRAP OR FASTENING

- the paper model
- cutting the steel plate
- setting in place
 - . the tab
 - . the internal wall
 - . the counter pressure
 - . the external wall, closing
- placement on the leather

- . The upper strap is a very important part of the femoral prosthesis.
 - it assures the pressure and the counter pressure
 - it guarantees the correct setting of the leather
 - it is rivetted to the uprights
 - it allows for the fixing of the leather to the braces

- . The strap is cut out from a thick steel plate (2mm)
- . It is rolled out the upper part of the leather and is closed by 2 rivets on the front side.
- . Its fabrication is carried out by the making of a model, tried out on the leather.

THE PAPER MODEL

Sketch on the leather the correct shape of the strap or fastener.

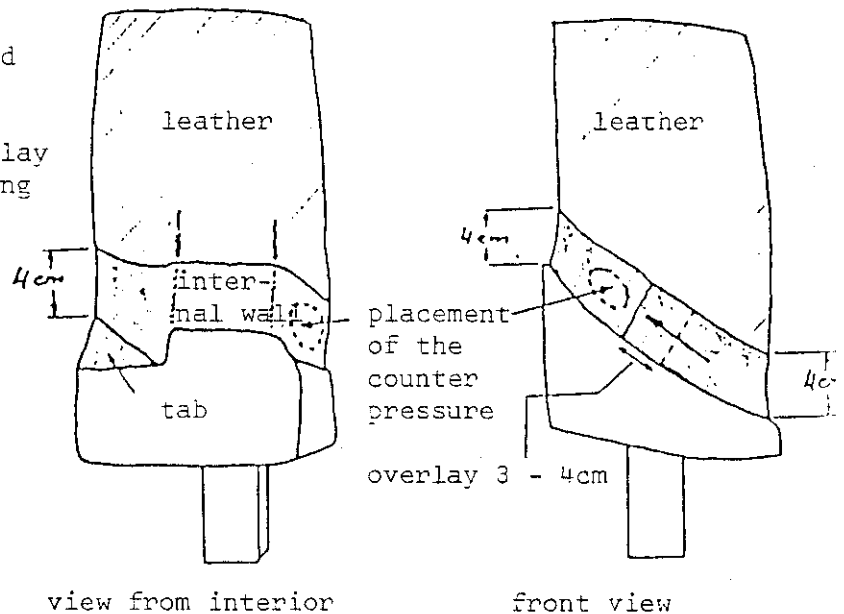
- . Cut out a paper bank (from newspaper or craft paper), 10 cm in wide and of a sufficient length to allow it to completely surround the leather, with an overlay of 3 to 4 cm.

Apply the paper band to the leather, at the same time, adjusting the tab. The paper band passes over the internal wall and the counter pressure. Now adjust it on the external wall and the anterior wall.

- . Adjustments are made by successive trial cutouts.

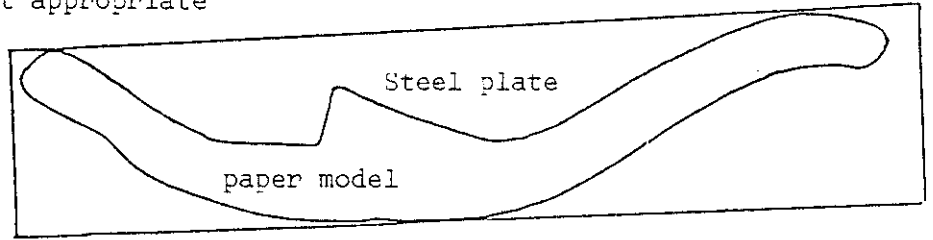
The paper model should follow the upper edge of the leather. It should be 4 cm in width. It fits together to the point just at the exterior of the counter pressure and has an overlay of 3 to 4 cm. This allows for closing the fastening.

The paper model should be perfectly applied to the leather

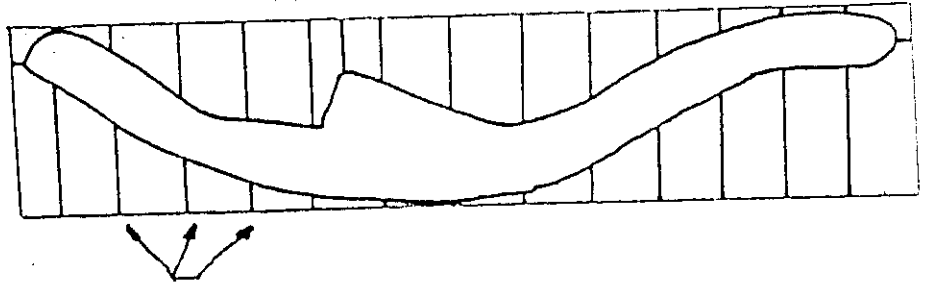


CUTTING OF THE STEEL PLATE

Bring the paper model on to the steel plate, taking care to chose the most appropriate and economic position.



Cut out the shape obtained by cutting it with a graving tool



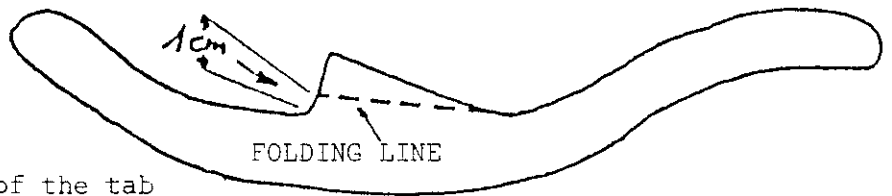
TECHNICAL NOTE

you can sketch the shape with a graving tool and saw the steel plate at regular intervals, Remove any extra pieces with pliers.

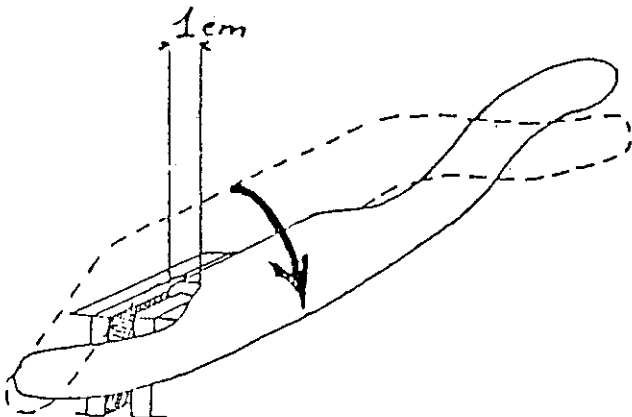
. Smooth the slice of the steek plate in such a way that the fastener cannot cause cuts (no rough edges).

SETTING IN PLACE

THE TAB

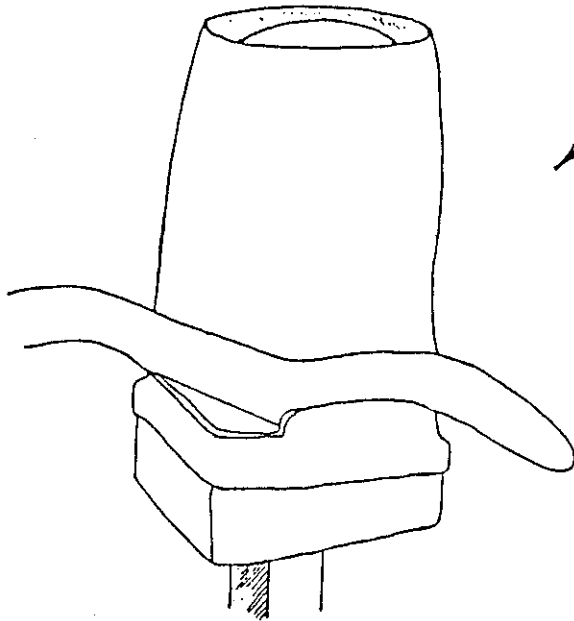
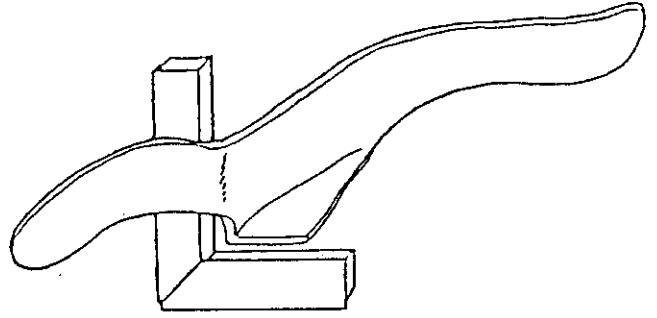


Mark out the the folding line of the tab leavubg a margin of 1 cm (between the top of the tab and the internal wall)



FOLD THE TAB AT A SQUARE ANGLE ON THE VICE.

Take care to control a true square angle of the tab.

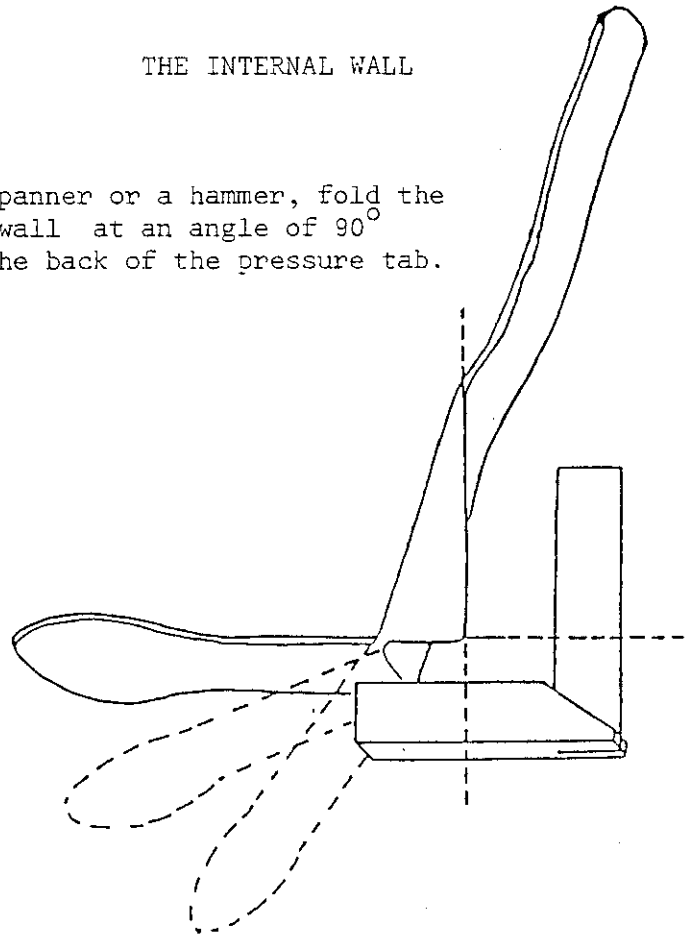


check this on the leather

THE INTERNAL WALL

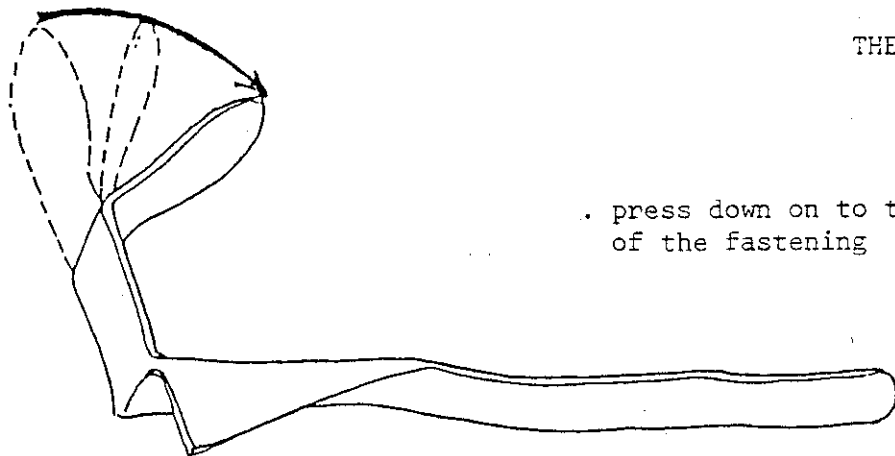
Using a spanner or a hammer, fold the internal wall at an angle of 90° towards the back of the pressure tab.

- . verify you have a true right angle
- . AND CHECK IT ON THE LEATHER

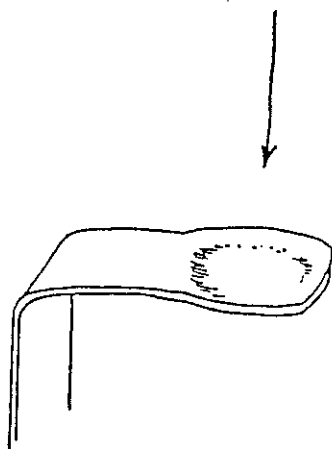
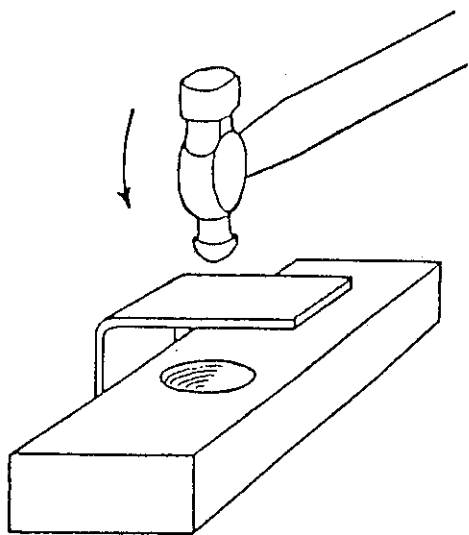


THE COUNTER PRESSURE

- . press down on to the counter pressure the extremity of the fastening



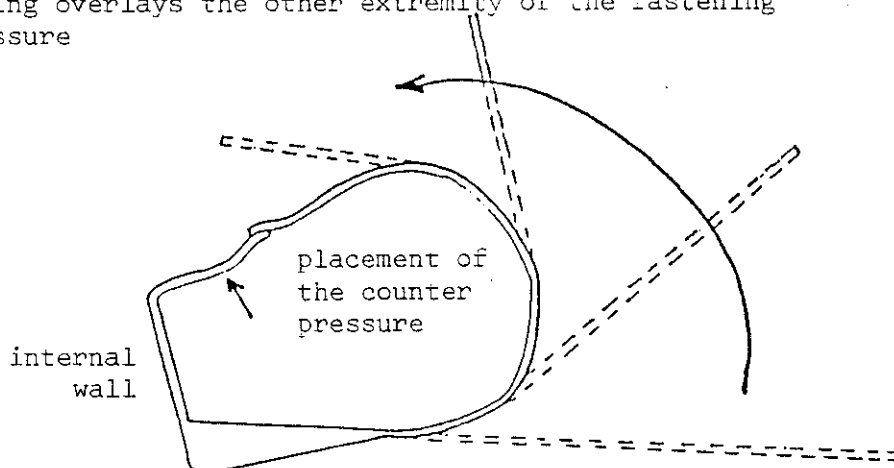
Hammer the counter pressed onto a shaped piece of wood to make a "spoon" shape

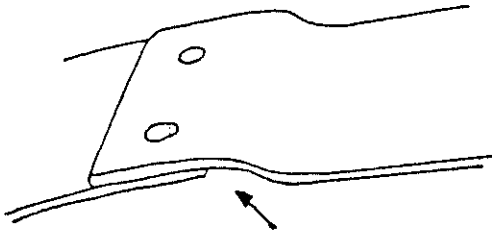
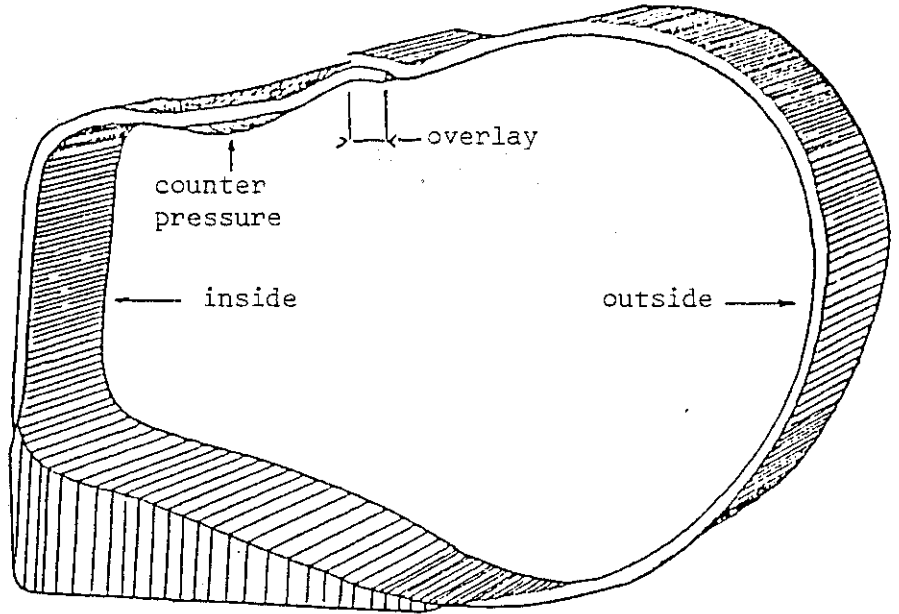


THIS "SPOON" SHOULD FIT AS TIGHTLY AS POSSIBLE IN THE DEPRESSION OF THE COUNTER PRESSURE ON THE LEATHER

THE EXTERNAL WALL, CLOSING

- . Now press down on the external wall and on the anterior wall, the remaining part of the fastening.
- . This part of the fastening overlays the other extremity of the fastening OUTSIDE the counter pressure



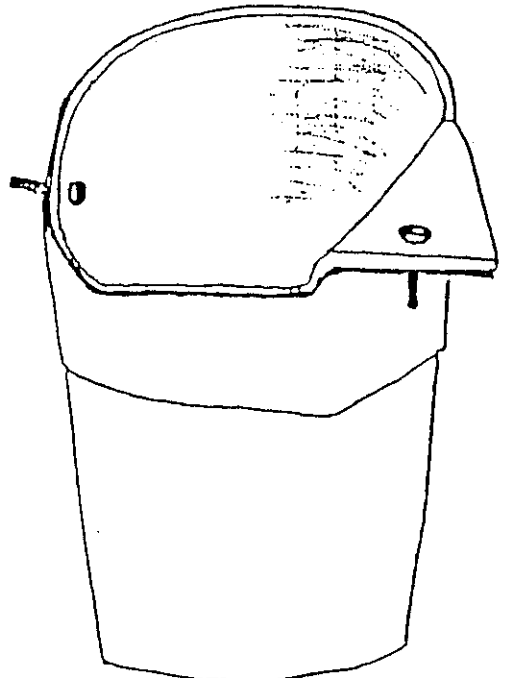


- . Make a "step" to allow for recovering the extremities
- . The fastening will be closed by the use of 2 special pins, each of 4 mm diameter

- . For final mounting, the pins will be replaced by rivets measuring 4 mm in diameter, drilled on the interior and chaped on the exterior,

PLACEMENT ON THE LEATHER

- . The fastening is perfectly adjusted to the leather.
- . It is provisionally fixed to the leather by using 2 pins
 - 1 on the tab
 - 1 in the counter pressure



CHAPTER 9 : ALIGNMENTS

- alignment on the front (frontal)
- alignment on the side (sagittal)
- rotation
- the length of the prosthesis

Alignment of the femoral prosthesis may be defined as the placement of the leather in relation to the uprights and the peg.

It is necessary to follow four steps to do this correctly.

These steps are carried out simultaneously.

To give a better understanding, each step is described in this Chapter.

Once alignment has been completed and the uprights and peg assembled, the upper fastening is fixed to the leather by using two pins.

IMPORTANT:

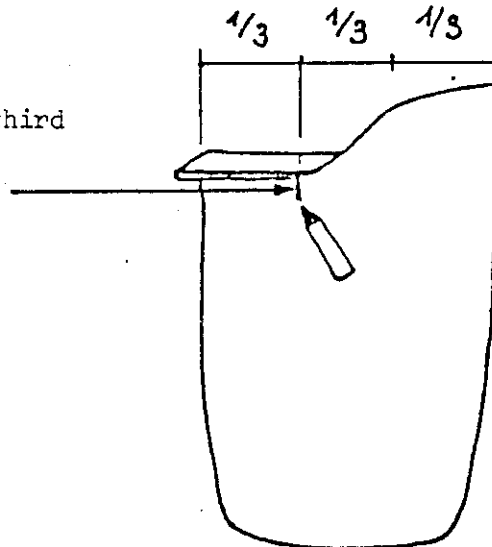
AT THIS STAGE, YOU ARE MAKING A STANDARD OR AVERAGE ALIGNMENT ON THE JOINERY BENCH. THE PRESENCE OF THE AMPUTEE IS NOT REQUIRED.

ADJUSTMENTS WILL BE MADE LATER WHEN THE PROSTHESIS IS FITTED ON THE AMPUTEE.

FRONTAL ALIGNMENT

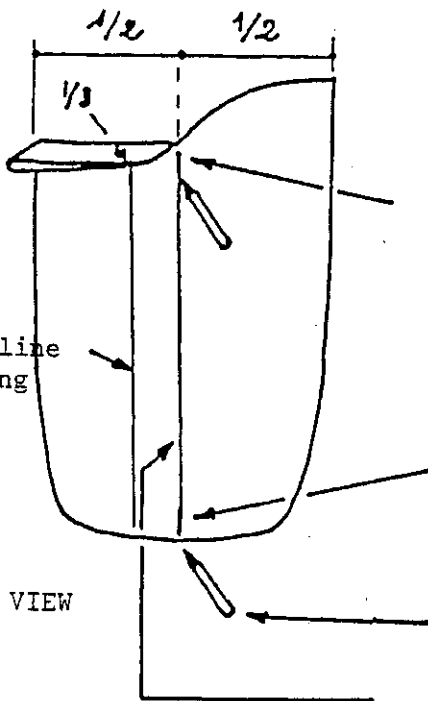
hold the leather at arm's length, the back side turned towards you, facing you.

Mark out and trace by looking each third of the back side.



BACK VIEW

Mark out and trace by looking the midpoint of the upper part of the leather.



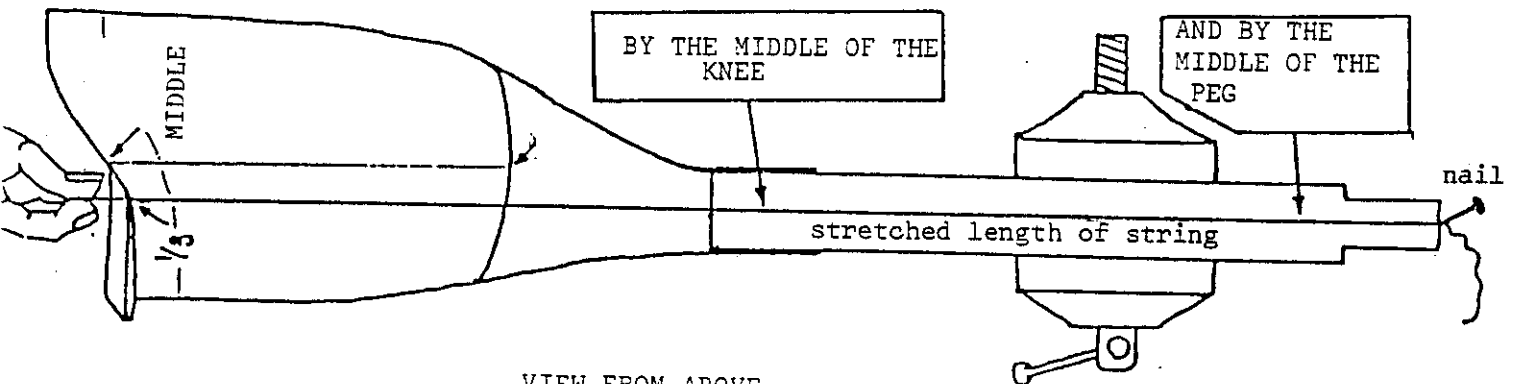
Mark out and trace by looking the midpoint of the lower part of the leather

Trace a line joining these two points.

THIS IS THE TURNING LINE OF THE LEATHER

Trace the line passing by the internal third and parallel to the turning line (charge line)

Twist the uprights so that this line passes"

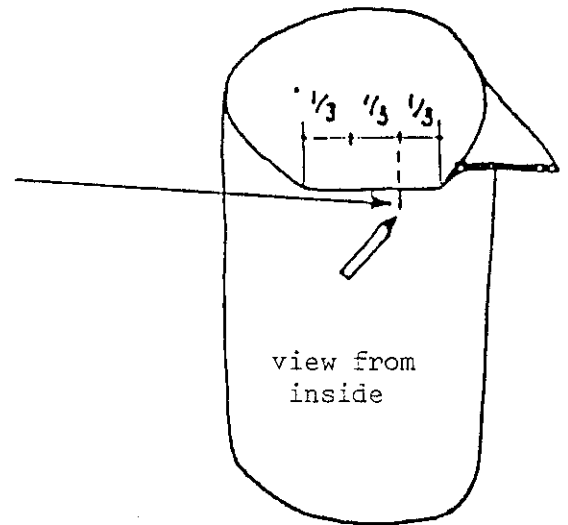


VIEW FROM ABOVE

SAGITTAL ALIGNMENT

. hold the leather at arm's length, the interior wall turned towards you, facing you.

Mark out and trace by looking the posterior third of the internal wall

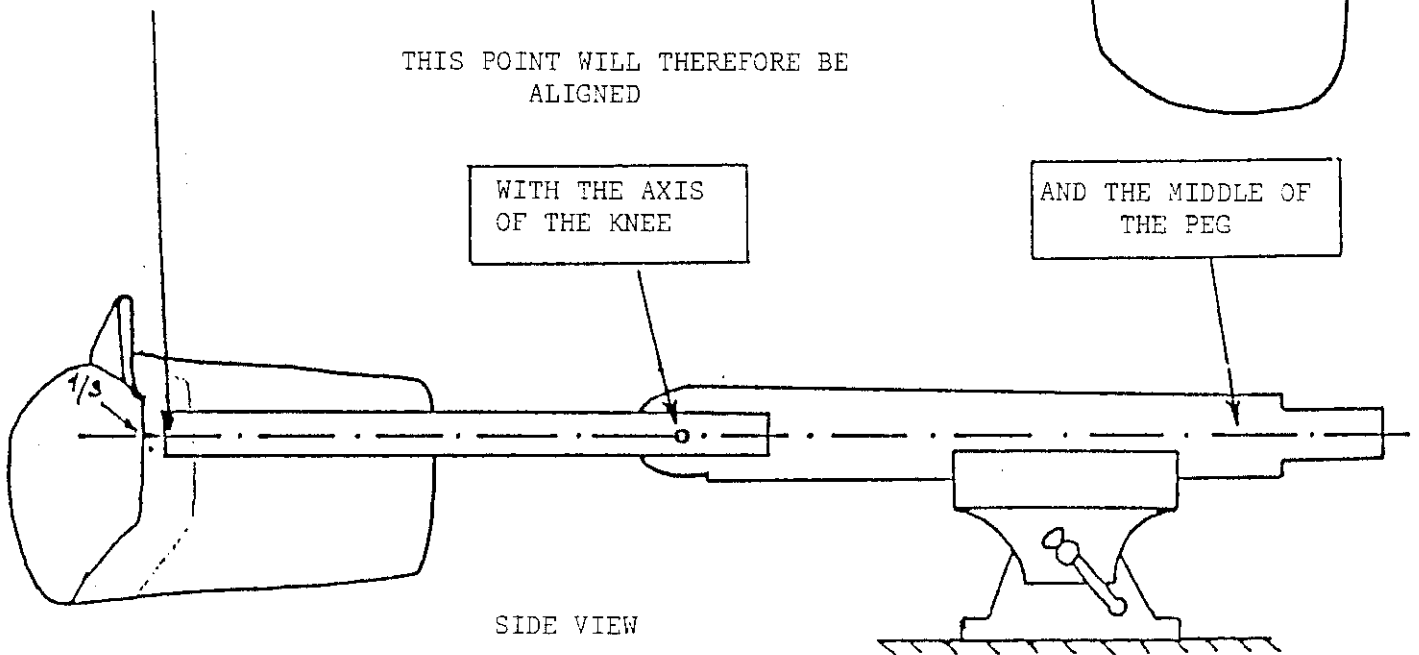


The middle of the internal upright will pass at the point.

THIS POINT WILL THEREFORE BE ALIGNED

WITH THE AXIS OF THE KNEE

AND THE MIDDLE OF THE PEG

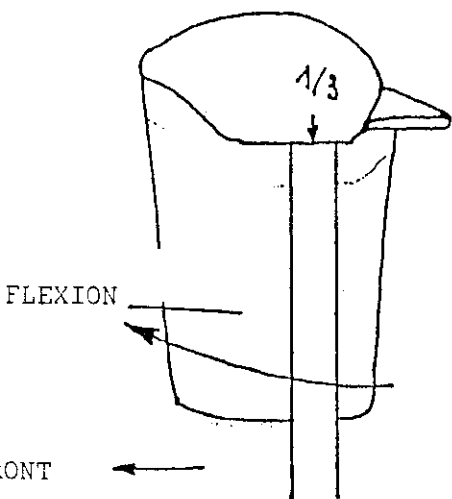


SIDE VIEW

PLACE THE LEATHER IN FLEXION IN THE UPRIGHTS
(the bottom of the leather is more to the front than the top)

Allow approximate flexion of:

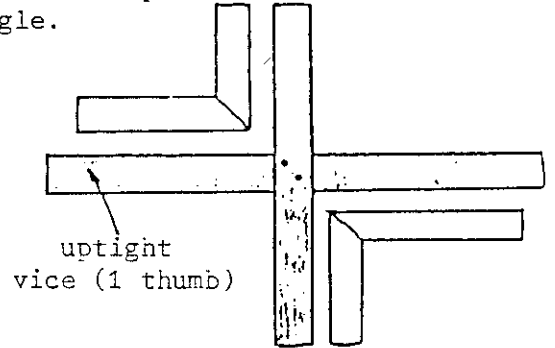
	5°	10°	15°
IF THE STUMP IS	LONG	MEDIUM	or SHORT



The flexion of the leather should be exactly regulated, as soon as the amputee takes his first steps. The leather should be able to pivot around the 2 pins, at the top of the uprights - it will be held at the bottom by a string or a piece of wire.

ROTATION

- . You have now determined the placement of the internal upright (1/3 at the posterior of the internal wall).
- . You should now determine the placement of the external upright. In doing this, you will also be able to determine the ROTATION OF THE LEATHER
- . To do this you will utilise a "cross", made in the workshop with two pieces of upright, rivetted at a right angle.

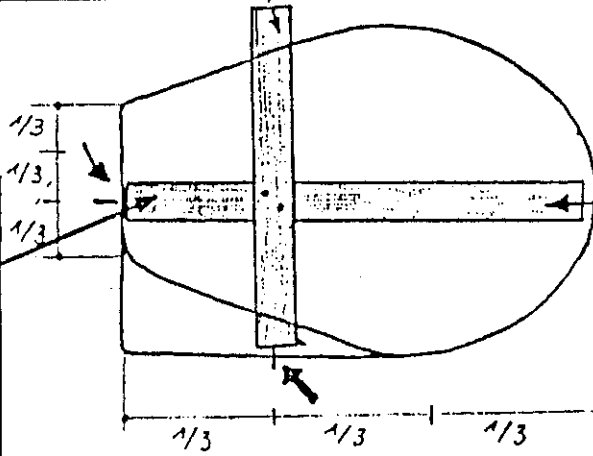


- . Place this cross above the leather by doing the following.

THIS BRANCH IS PARALLEL TO THE INTERNAL WALL. IT PARTLY PASSES THE INTERNAL THIRD OF THE POSTERIOR WALL.



THIS BRANCH IS PARALLEL TO THE POSTERIOR EDGE OF THE TAB. IT PASSES THROUGH BY POSTERIOR THIRD OF THE INTERNAL WALL.



THIS BRANCH WILL GIVE YOU THE POSITION FOR THE EXTERNAL UPRIGHT

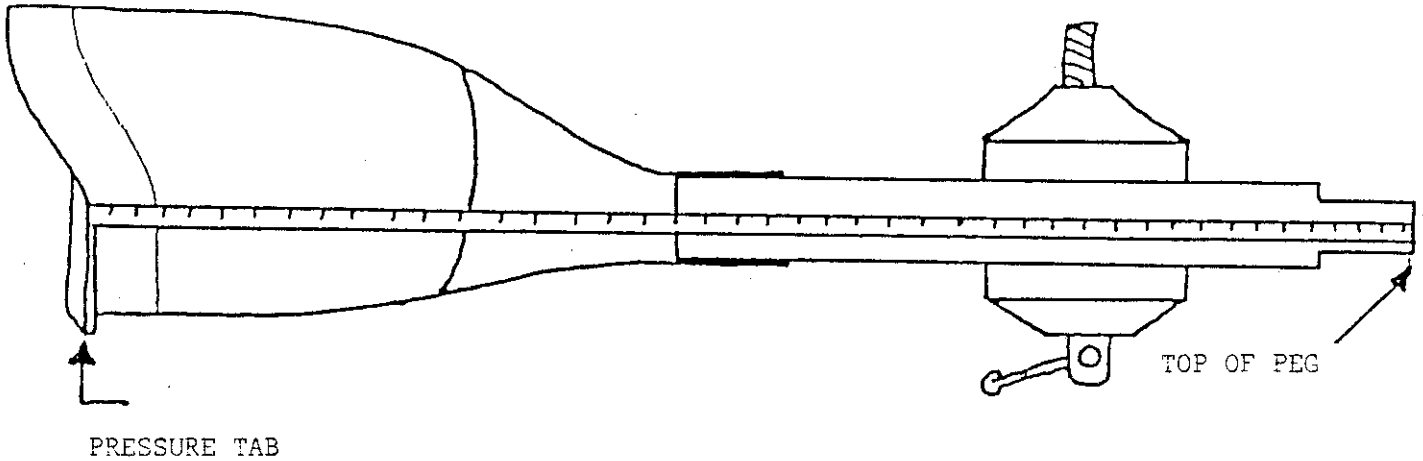
VIEW FROM ABOVE.

THE LENGTH OF THE PROSTHESIS

- The length of the prosthesis is measured from the pressure tab to the top of the peg.

$$\text{length} = T - 1 \text{ cm}$$

thickness of the sole of the foot.



NOTE:

You measure the length with a metre rule and you use the string utilised in doing the frontal alignment. Tie a knot to mark the required length. This will will it unnecessary for you to manipulate the measuring rule, while following the procedures for the twisting or torsion of the bars.

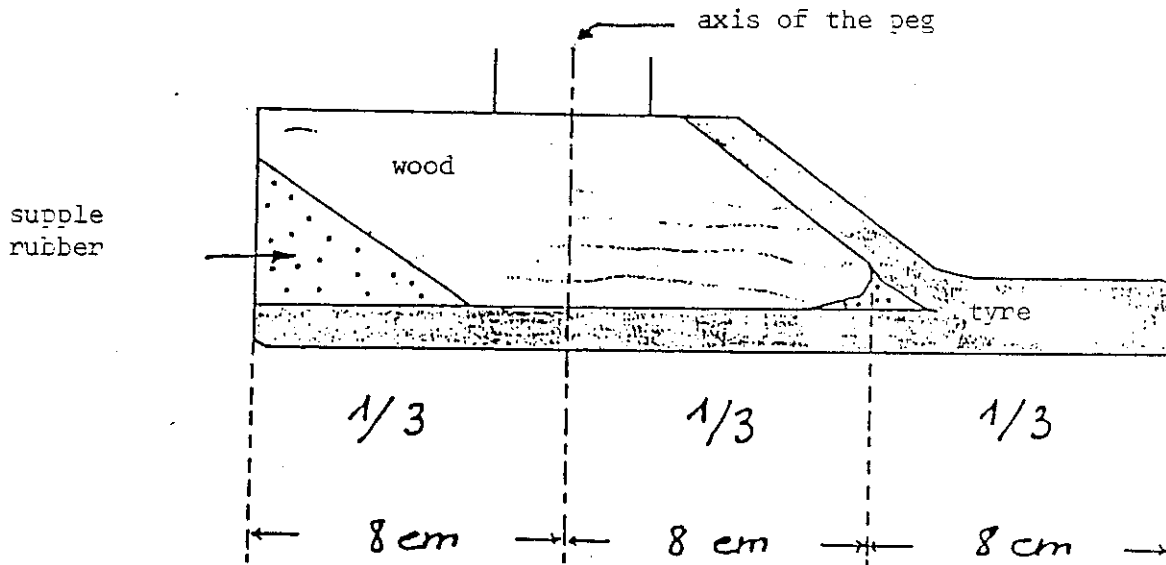
- Check the length of the prosthesis and cut those pieces of the upright which are above the upper fastening.

CHAPTER 11 : THE FOOT

- the measurements
- drilling/boring
- cutting
- fitting

THE MEASUREMENTS

DESCRIBED BELOW IS A STANDARD FOOT MEASURING 24 CM



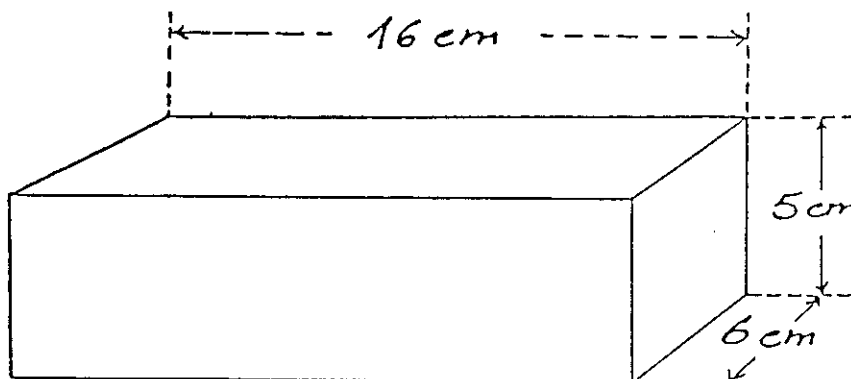
, The foot is divided into three tiers or layers (8 cm each for a standard foot)

WHERE AN AMPUTEE NEEDS A FOOT WITH DIFFERENT MEASUREMENTS FROM THE STANDARD FOOT, REMEMBER TO ALWAYS TAKE ACCOUNT OF THE THREE TIERS OR LAYERS.

. The foot is made of wood, rubber and tyre.

To length of the wood is in two layers - 16 cm

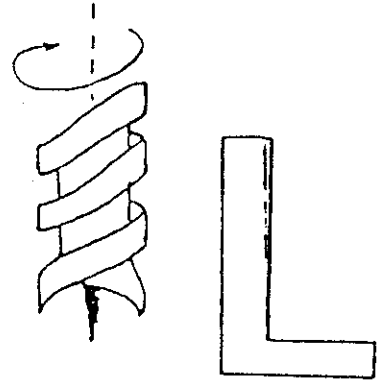
- the width is 6 cm
- the height is 5 cm



THIS PIECE OF WOOD IS PLANED AND FORMS A PERFECT SQUARE ANGLE.

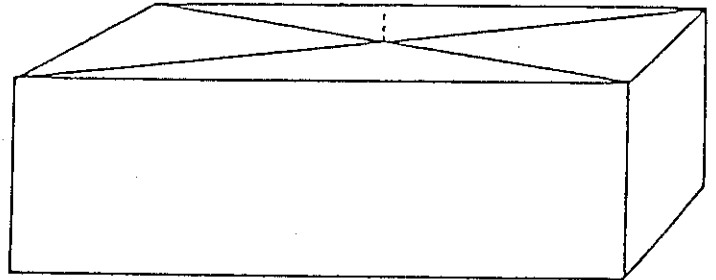
DRILLING / BORING

- . Determine the midpoint of the piece of wood
- . Drill, little by little, using a bore of 4 cm diameter



ATTENTION:

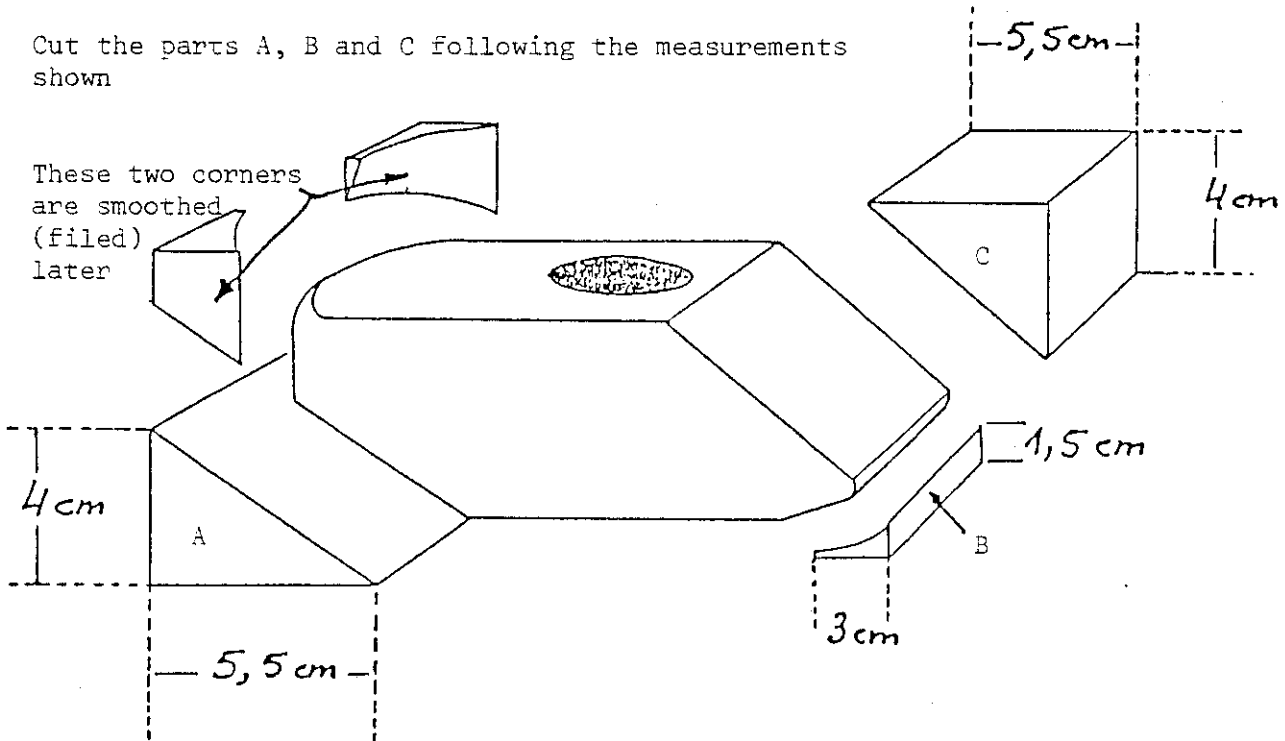
It is important that the boring should be done exactly at a true right angle.



CUTTING

Cut the parts A, B and C following the measurements shown

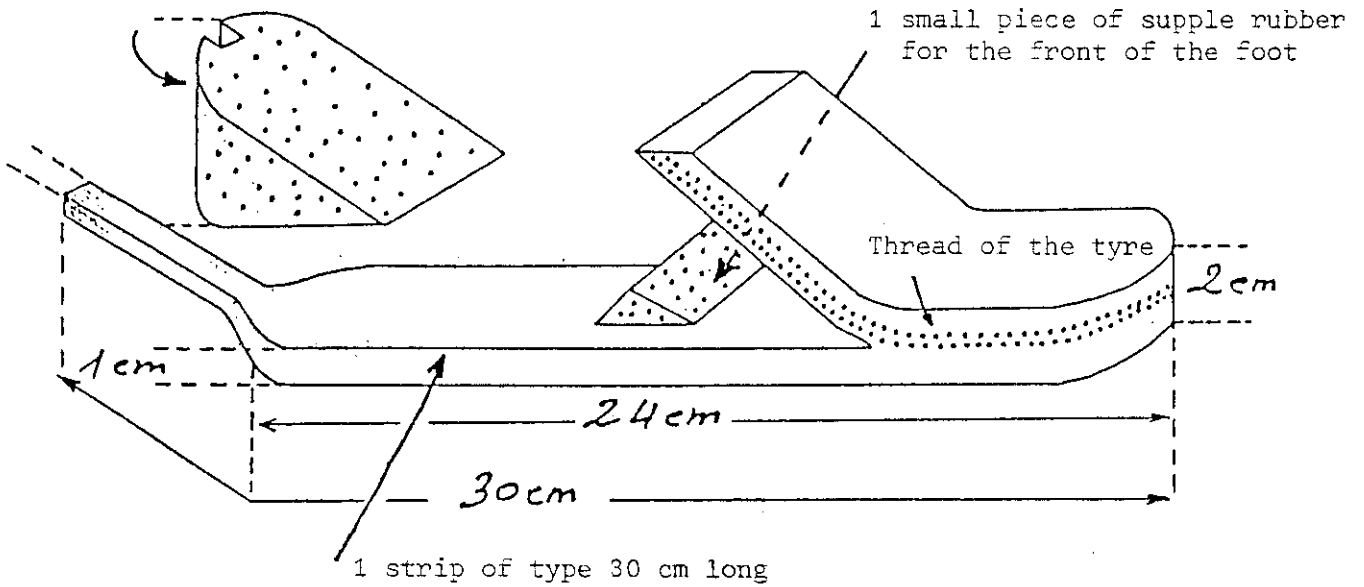
These two corners are smoothed (filed) later



FITTING

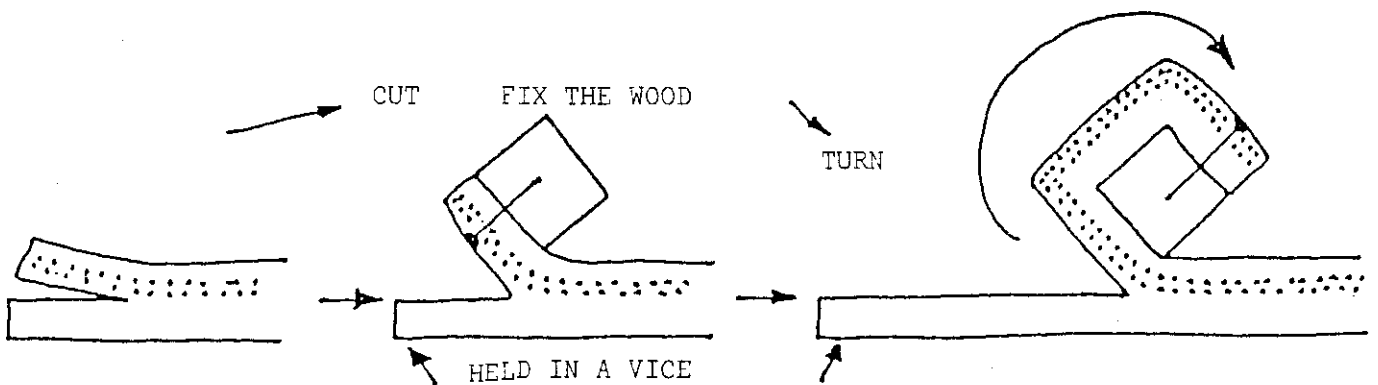
. Cut out

1 corner of supple rubber
measuring 4 cm x 5.5 cm



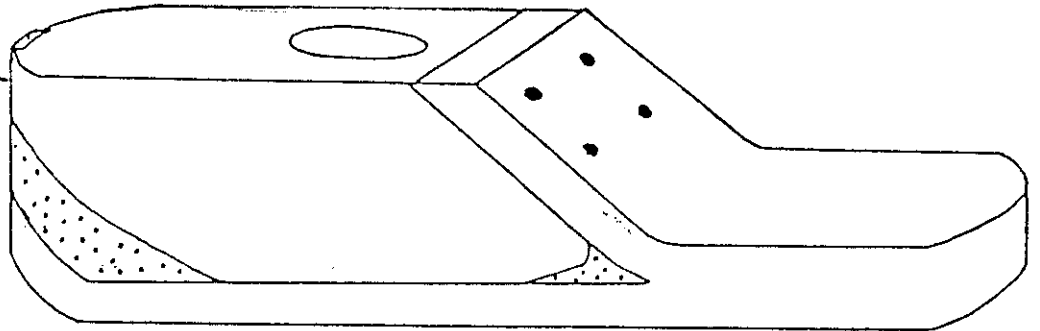
TECHNICAL NOTE:

to be able to separate more easily the thread of the tyre, slice the tyre at full thickness. This will separate the thread from the band to be rolled over a few centimetres. Then nail the piece of thread to a piece of wood which will then be rolled to unstick the thread.



Assemble all the pieces using either glue or nails.

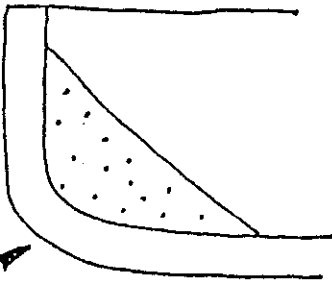
the tongue-like strip made of tyre encased in supple rubber; inside the wood and then nailed.



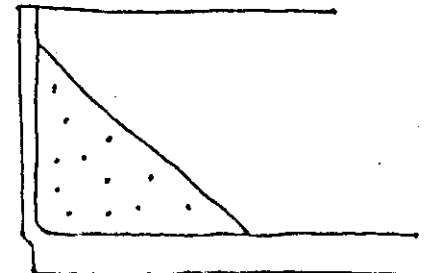
THE UNDERNEATH OF THE SOLE SHOULD BE PERFECTLY FLAT

THE HEEL SHOULD NOT BE ROUNDED

NO



YES



REFINE THE TONGUE-LIKE STRIP OF TYRE BEFORE PRESSING IT DOWN ON THE HEEL.

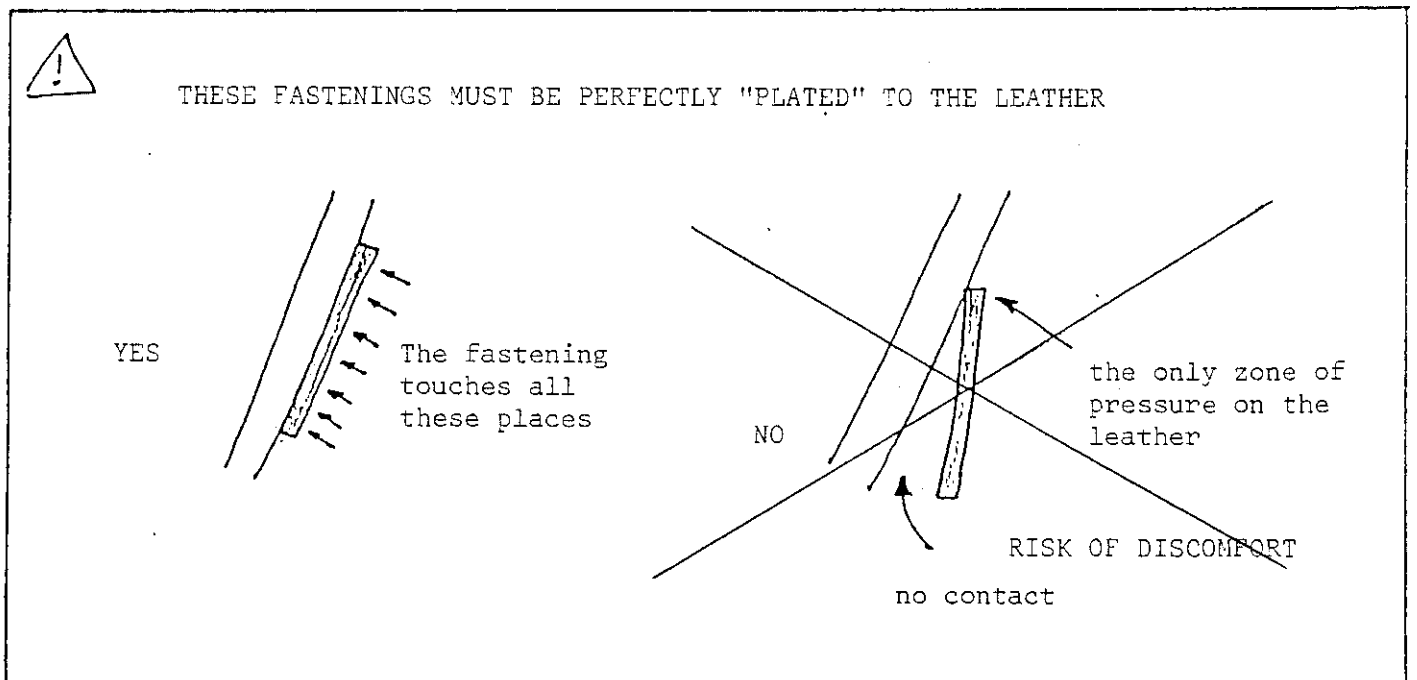
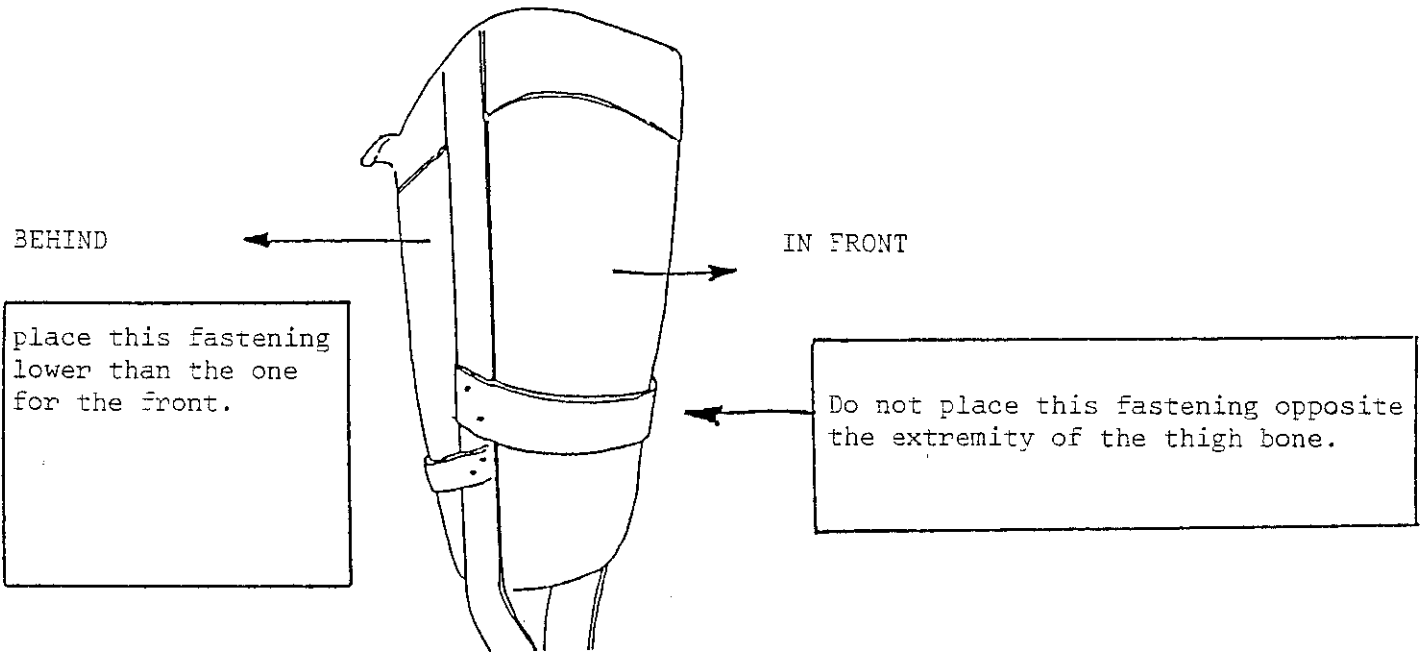
YOU MAY ROUND OFF THE BACK OF THE FOOT AND THE RIDGE TO FACILITATE WEARING A SHOE.
REMEMBER TO TAKE ACCOUNT OF THE TONGUE!

CHAPTER 12 : THE FINAL STAGES OF PRODUCTION

- the lower fastenings
- the belt
- the making of buckles
- rivetting
- finishing
- fitting the foot

LOWER STRAPS OR FASTENINGS

- Use steel plate, 2 mm thick.
- These fastenings are easy to make, they are placed at the exterior of the of the uprights, in an opposite fasjion to the upper fastening which is placed at the interior of the uprights.
- These fastenings are 25mm wide - you can increase the width if the stump is painful or fragile (as may be the case with the leper).

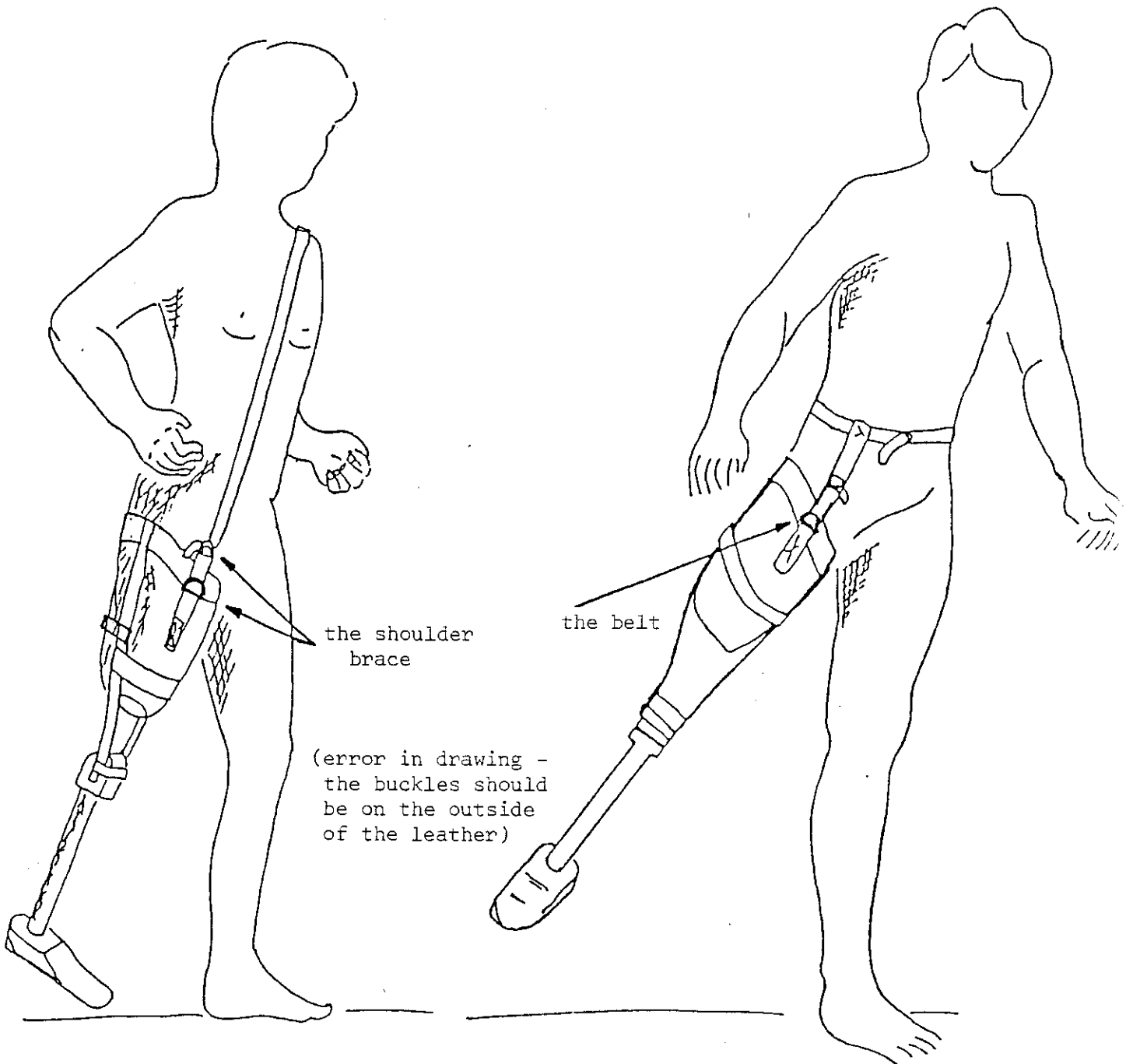


- The fastenings are fixed with pins and then by rivets of 4 mm diameter

THE BELT OR THE BRACE

Once this prosthesis has been completed, it is attached to the amputee by means of a belt or a brace.

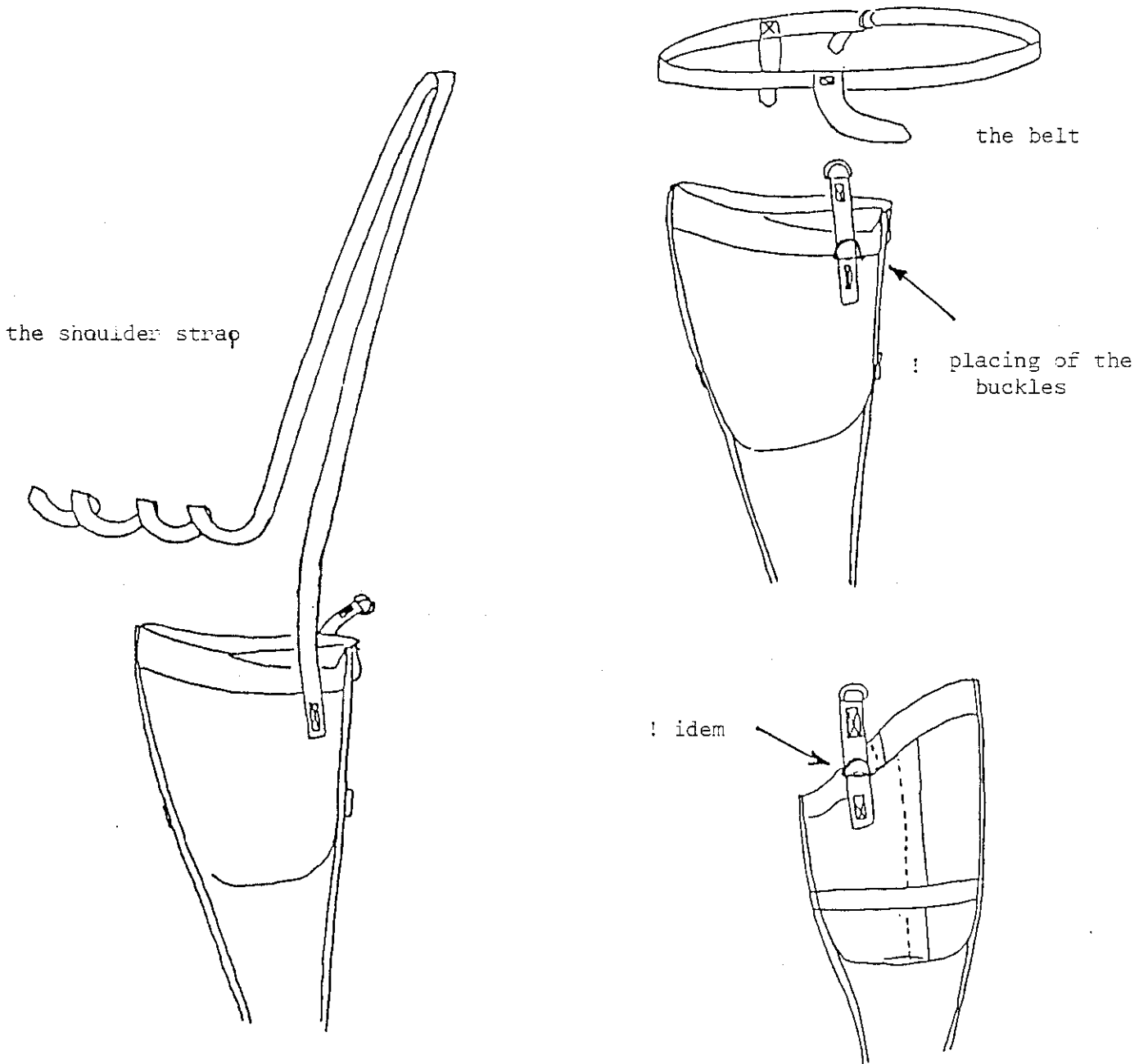
- . The belt made of material encircles the body. It is fastened by two buckles, it is attached to the prosthesis by two short straps, also held by place by two buckles.
- . The shoulder brace is made of material and passes over the opposite shoulder of the patient from the amputated leg. It is fastened by two buckles and is fixed directly to the prosthesis.



Whether the means of attaching the prosthesis is a belt or a shoulder strap, the actual fixing points on the prosthesis are the same.

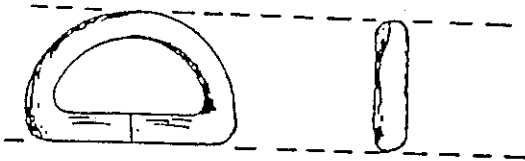
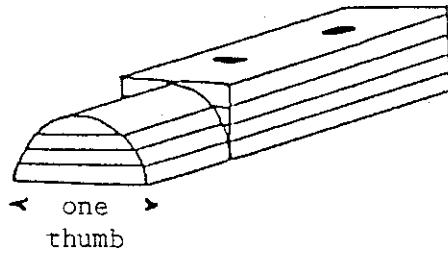
- . On the anterior wall, the strap is sewn directly with the sleeve,, just beneath the counter pressure. (refer to Chapter on Alignment - section 'rotation')
- . On the posterior wall, the strap is sewn directly with the sleeve, just below the tab, at a level of 1/3 internal.

The placement of the attachments is given by the branch of the cross, parallel to the internal wall.



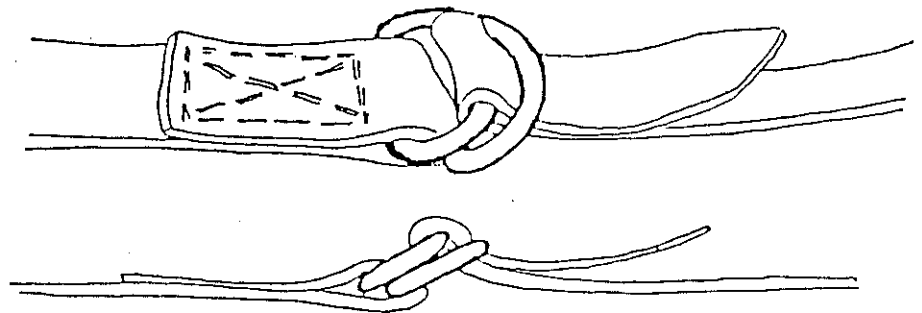
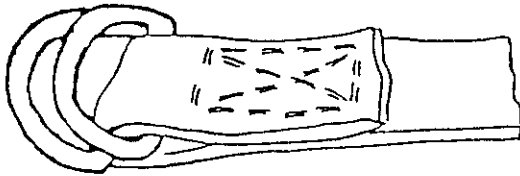
MAKING THE BUCKLES

The buckle is a piece of iron thread 4 mm in diameter. It is bent into position using a specially prepared 'shaping' block in a drop bar.



Two buckles made in this way are fixed to the extremity of the strap.

The strap folds back onto itself and is sewn on cross.



This type of buckle is very solid and can be adjusted to fit all sizes. It is self-rightening.

The upper fastening is provisionally fixed to the two uprights following the alignments explained in Chapter 10.

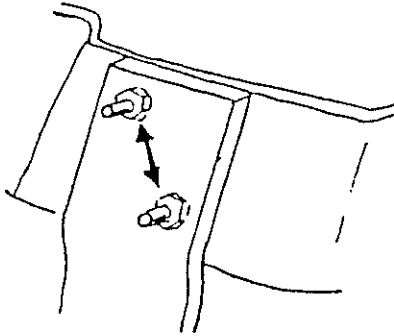
This assembly is carried out using pins 4 mm in diameter. These pins can remain on the prosthesis before the final stages of production, at which point a final assembly is done by rivetting (nails, iron thread, etc).

- 1) Fix the upper fastening to the uprights.
- 2) Fix the leather to the fastening.



cross view of a mounting with temporary pins.

To lessen the possibilities of weakening the fastening, it is recommending that smoothing of the interior of the upright be made.



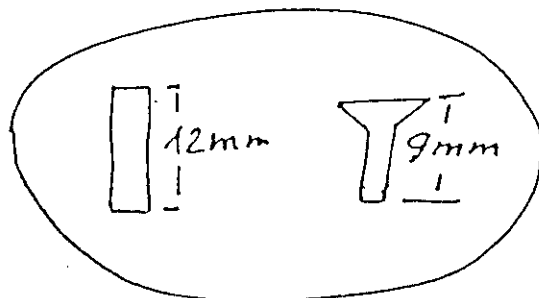
Final rivetting will be carried out with great precision after the trial period.

Rivets should be as far apart as possible (diagonally)

4 rivets in the form of a cross may be necessary for those amputees who weigh a lot.



The rivets are made with steel wire or with nails 4 mm in diameter. The levelled head is put in place using a matrix made for the purpose at the workshop.



FINISHING

When the prosthesis is considered and carefully examined after the trial period and following rivetting all appropriate pieces, it is necessary to recover the interior of the sleeve with a thin sheet of leather, particularly in those zones which are the most likely to be irritated or become painful.

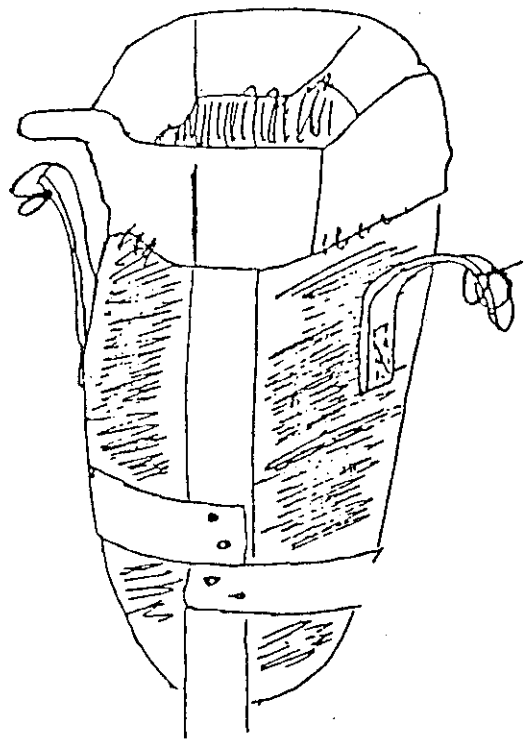
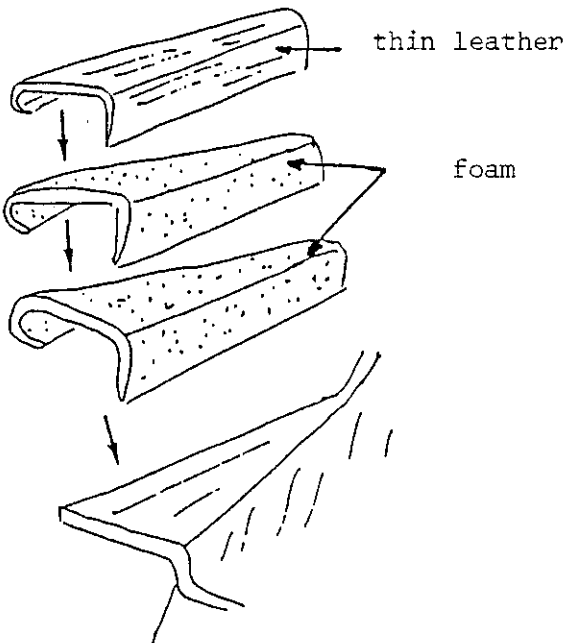
These are :

- the seat tab
- the upper edge of the leather and the upper edge of the fastening
- the stitching

. the tab

stick one or two layers of microcellular foam (1 or 2 mm thick) to make a comfortable seat.

The leather is again bevelled to ensure complete smoothness

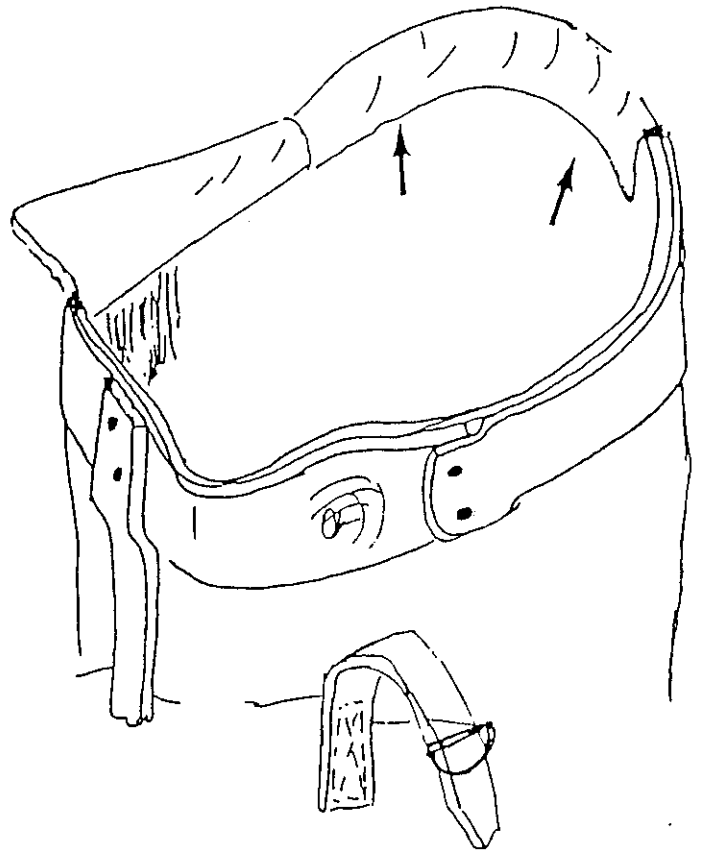


. the upper edge of the leather and the fastening

stick all along the top of the prosthesis, pieces of thin leather. Juxtapose them.

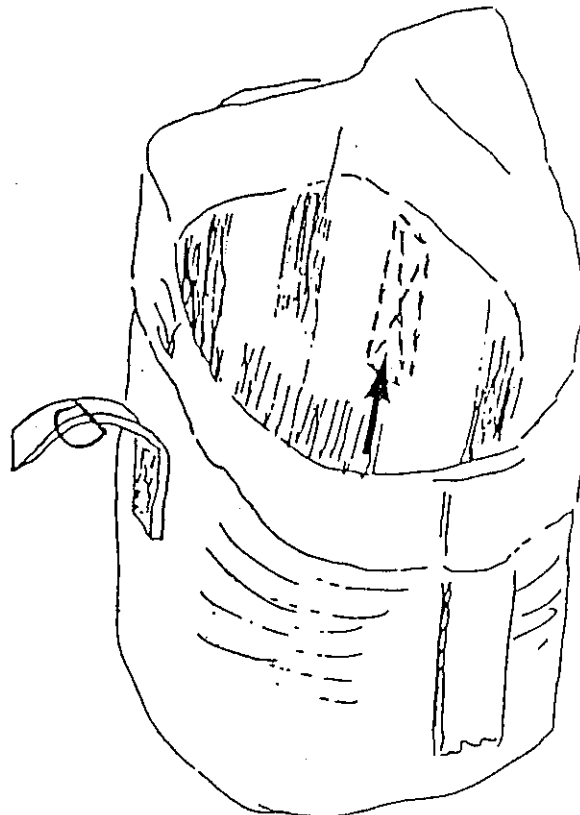
OR

Smooth out the upper edge of the leather on the fastening, after having refined it.



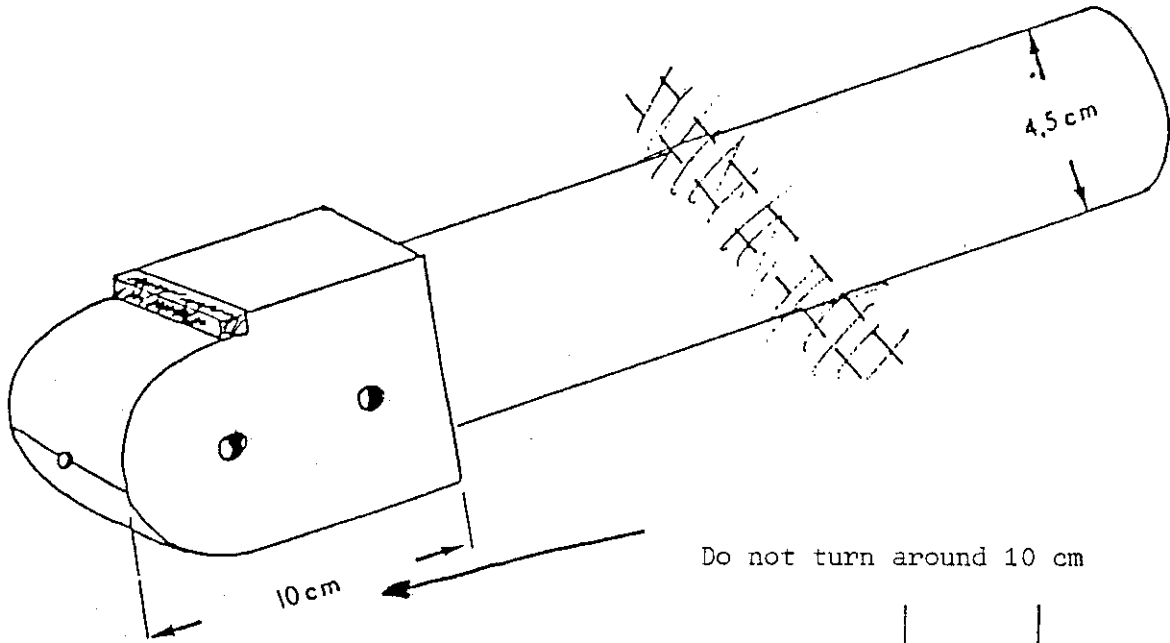
. the stitching

protect all stitches on the interior with small pieces of thin leather



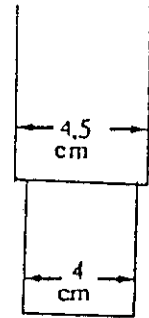
FITTING THE FOOT

Round off or turn the peg 4.5 cm



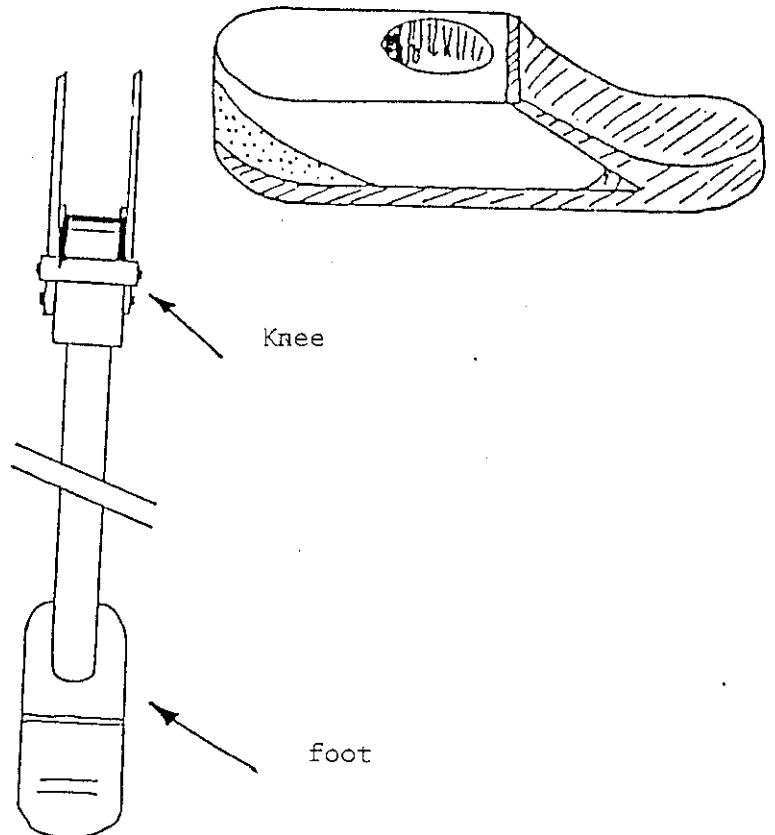
Do not turn around 10 cm

THERE SHOULD NOT BE ANY PLAY BETWEEN THE PEG AND THE FOOT AND THE PEG SHOULD HAVE DIRECT CONTACT WITH THE SOLE.



PAY ATTENTION TO THE LENGTH OF THE PROSTHESIS

THE FOOT IS STUCK ONTO THE PEG.



CHAPTER 13 : OBVIOUS FAULTS

- errors in :-
- alignment
 - length
 - rotation
 - the knee
 - the foot
 - the tab
 - pain or chafine
 - in the gait of the amputee fitted with a device

OBVIOUS FAULTS

- are visible from the first trying on of the prosthesis
- are dependent upon the construction of the prosthesis

THESE FAULTS MUST BE CORRECTED BEFORE
FINAL MOUNTING.

Note:

These faults are only be major if the prosthesis has been correctly fitted on the amputee and/or if there are abnormalities of the stump.

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