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INTRODUCTION

This pamphlet was prepared for the purpose of acquainting patients scheduled to be fitted with the Boston Brace with their planned treatment program. It will assist you and your family in achieving a thorough understanding of how the brace works, how to apply and take care of it properly, and the exercises and activities you should do. Your doctor, orthotist and physical therapist will be working closely together to assure that you will receive the maximum benefit from your treatment program.

GENERAL INFORMATION ABOUT SCOLIOSIS

Scoliosis, a twisting curvature of the spine, often has no known cause; however, a positive family history is frequently elicited. If one child is found to have scoliosis, all the children in the family and also their children should be closely observed throughout childhood and adolescence for evidence of a similar problem. Some of the common findings that may reveal the presence of scoliosis are a high shoulder or hip, a short leg, a "hump" of the rib cage while the child is bending forward or a constant tilting of the head to one side. Frequently scoliosis is discovered by the parents while new clothes are being fitted, on the beach when the child is wearing a bathing suit, or leafing through the family photograph album. Girls are more often found to have scoliosis than boys and the most common curve is seen in the right upper back.

THE BOSTON BRACE SYSTEM

The Boston Brace has been developed from the Milwaukee Brace, an effective bracing system in the use since the late 1940's. Less cumbersome than other braces, the Boston Brace often is not noticed by your friends. The brace is

designed from a pre-fabricated module and trimmed to fit you exactly, based on your X-ray films. The module is made of a hard polypropene outer shell and lined with a soft polyethylene material, which allows a close fit of the brace to your body. The closeness of the fit gives the brace a firm grip on the pelvis from which the corrective forces are directed at the spine. The correction is applied by inserting carefully placed pads in the appropriate places (again based on your X-rays) and leaving open or relief areas opposite the pads to allow you to actively shift your spine into a corrected position. The brace is extremely resistant to cracking or breaking, although occasionally rivets, straps and buckles may need to be replaced.

GETTING USED TO THE BRACE

When you first have the brace put on, you will immediately feel as though it is too tight. This is normal - the brace is very tight, leading to some discomfort until you become accustomed to it. Areas under the pads, over the pelvis and along the side margins may become sore when you start wearing of the brace. Other sensations you may undergo during the breaking in period are difficulty in deep breathing, a temporary decrease in appetite, feeling you are walking in a "bent over" position and soreness and aching in the front of the hips. All of these sensations will disappear a week or two as your body adjusts to the brace and tight muscles stretch out. You will soon feel normal wearing the brace.

In the following parts of this pamphlet are more specific instructions about wearing and caring for the brace, as well as the exercises you will be taught. Please read it over before your first appointment in the morning and direct any questions you may have to your doctor, orthotist, or physical therapist.

APPLICATION OF BOSTON BRACE

Objectives:

1. To apply Boston Brace
 2. To teach patient to stand correctly in Boston Brace
- I. Application of Boston Brace without superstructure
- A. Patient standing
1. Hold Brace in left hand and stand behind patient.
 2. Extend both arms and center the Brace in front of patient.
 3. Open posterior segments.
 4. Slip Brace over pelvic crest and push it well downward on the pelvis.
 5. Make sure there are no wrinkles in T-shirt.
 6. Slip straps through buckles (loosely).
 7. Position patient facing a firm surface with hands securely on surface.
 8. Have patient bend knees approximately 45 degrees.
 9. Place your right hip firmly against patient's right hip.
 10. Approximate both sides of Brace by reaching behind the patient with your right arm and squeezing the Brace together between your arm and your hip.
 11. Keep a firm grasp - secure bottom buckle first, then top buckle.
 12. Adjust both buckles so Brace is very snug.
 13. Mark section on strap at final fastening position for patient's information.
- II. Application of Boston Brace with superstructure
- A. Patient standing
1. Hold Brace in left hand and stand behind patient.
 2. Extend both arms and center Brace in front of patient.
 3. Grasp metal uprights and open posterior segments.
 4. Have patient walk into Brace slipping sideways through your opening and placing both his arms between back and front uprights. His arm should pass above the chest pad.

5. Position Brace over pelvic crest and push it downward on the pelvis.
6. Make sure there are no wrinkles in T-shirt.
7. Position patient facing a firm surface with hands securely on surface.
8. Tighten neck ring by turning screw clockwise.
10. Slip bucket strap behind and over right posterior upright and fasten securely.

III. Application of Boston Brace without superstructure, in side-lying position

- A. Patient standing
 1. Hold Brace in left hand and stand behind patient.
 2. Extend both arms and center Brace in front of patient.
 3. Open posterior segments.
 4. Slip Brace over pelvic crest, push it downward on the pelvis.
 5. Make sure there are no wrinkles in T-shirt.
 6. Slip straps through buckles and tighten brace as much as possible.
- B. Patient lying on left side with knees bent
 PRECAUTION: Be careful not to rotate Brace.
 1. Apply downward pressure over right side pelvic piece and fasten buckles securely.

IV. Application of Boston Brace with superstructure in side-lying

- A. Patient standing
 1. Hold Brace in left hand and stand behind patient.
 2. Extend both arms and center Brace in front of patient.
 3. Grasp metal uprights and open posterior segments.
 4. Have patient walk into Brace slipping sideways through your opening and placing both his arms between back and front uprights. His arm should pass above the chest pad.
 5. Position Brace over pelvic crest and push it downward on the pelvis.
 6. Make sure there are no wrinkles in T-shirt.

- B. Patient lying on left side with knees bent
1. Slip bucket strap behind and over right back upright being sure that the opening of the neck ring slips into screw slot at the same time.
 2. Tighten neck ring by turning screw clockwise.
 3. Apply downward pressure to right side of pelvic piece, then fasten pelvic strap securely.

V. Teach patient to stand correctly in Brace

- A. Patient standing in front of mirror
1. Once Brace is secure, have patient straighten knees.
 2. Teach patient to assume a posterior pelvic tilt (see Group I exercises).
 3. While patient maintains lumbar flexion (posterior pelvic tilt), teach him to stand erect.

INSTRUCTIONS FOR WEARING A "BOSTON BRACE"

GOAL: TO WEAR THE BRACE 23 HOURS A DAY BY 2 - 3 WEEKS

I. PUTTING THE BRACE ON:

- a. PROPER BRACE APPLICATION TAKES TWO PEOPLE, the wearer and a helper.
- b. The brace is worn over a cotton undershirt with the underpants worn over the brace. For girls, the brace is worn over a bra.
- c. Putting the brace on:
 1. Standing up, put the brace on with the opening at the back.
 2. Make sure all the straps are outside.
 3. Make sure the brace is not twisted and is facing straight ahead.
 4. BEND YOUR HIPS & KNEES ABOUT 45°. The brace will fit properly only if this is done.
 5. Make sure the sausage-shaped pads around the sides are above your hip bones.
 6. Pull the extra cloth of the undershirt out at the brace opening and make sure there are no wrinkles in the undershirt (wrinkles can cause pressure sores).
 7. Thread straps through the buckles and fasten buckles loosely.
 8. Lie down on a firm surface (the floor will do) on your left side.
 9. Bend your hips and knees about 45°.
 10. The helper then leans on the right side of the brace squeezing the brace together as tightly as possible, while pulling on the straps.
 11. When the brace is on as tightly as possible, fasten the buckles.

II. STARTING THE BRACE WEARING:

STAGE I (Six Hours)

1. Apply the brace properly and wear for two hours. Take it off and check the skin for redness and irritation. Give skin care with rubbing alcohol and friction.
2. If the skin is red and sore, brace must stay off for half an hour and then be reapplied for two more hours. The wearer and the helper must be able to judge when the skin can tolerate having the brace back on. No more than a half to one hour is needed out of the brace before it can be put back on.

3. Remove the brace and check the skin again. Give skin care. Put the brace on again if the skin will tolerate it for two more hours.
4. Remove the brace and give skin care.

SKIN CARE: it is very important to PREVENT SKIN BREAKDOWN (that is, sore, red, raw skin). The skin under the brace needs to be toughened up, especially where the brace rubs hard.

To protect the skin:

1. Bathe daily (bath or shower).
2. Apply rubbing alcohol with friction to all parts of the skin that are pink, and the areas where the brace presses a lot.
3. Always wear a cotton undershirt, tubular knit without side seams.
4. The skin will need frequent observing when the brace is first used (looking for pink areas).
5. DO NOT USE CREAMS, LOTIONS OR POWDER under the brace.

If there is a skin breakdown (sore, red, raw skin), the brace must not be reapplied until the skin heals - one day or more.

Sometimes the skin over the waist and hips gets darker. That is common and is not a problem. When the brace treatment is over, this color will go away.

STAGE II (Ten Hours)

If the brace is well tolerated for six hours the first day, start by putting the brace on four hours and then check every two hours and reapply the brace if the skin will tolerate it up to 10 hours. Give the skin care. The wearer may stay out of the brace all night. At this point the brace should be worn during school.

STAGE III (16 Hours)

If the brace was tolerated 10 hours yesterday, put the brace on after the morning bath. Remove after four hours for skin care and skin check. Put it back on if the skin will tolerate it until supper-time. Put the brace on at bedtime. It should be worn all night without checking unless the wearer complains.

STAGE IV

When the brace can be worn as above, it should be worn all day and all night except for one hour (usually before bedtime). Skin care should be given and the skin checked every four hours during the day if possible or three times a day: on getting up in the morning, at midafternoon (after school) and at bedtime. During the one hour out of the brace, exercises should be done. It usually takes one to two weeks to complete Stage IV.

III. CLEANING THE BRACE:

The hard plastic outer shell and the inner soft foam plastic should be cleansed every time you bathe. A cloth with soap and water can be used to clean the lining followed by a damp rinsing cloth. A terry towel can help to dry the foam plastic. If the lining is damp, a very cool hair blower can be used. The outer plastic can tolerate rough cleaning. The plastic brace should not be left in very hot sun or by a warm radiator as the plastic may soften and get out of shape.

IV. CLOTHING:

As a rule, loose fitting clothes will not reveal the outline of your brace. For girls, smocks and peasant blouses are easier to wear. Pants usually will be at least one size larger. Pants with elastic waistbands may fit more easily.

V. EXERCISES:

There are three groups of exercises that you will be given.

1. One will be a set of exercises done during the hour that you are not wearing the brace. This is done to keep your back limber and your muscles from getting weak.
2. The second and third sets of exercises are those which you do while you are wearing the brace. Group I should be done as often as you can during the day as it is these exercises which will help the brace to be more effective in the treatment of your scoliosis. Group II should be done as directed by your physical therapist.

NOTES:

1. Do not proceed to Stage II, etc., until Stage I is achieved.
2. Continue Stage IV skin care regimen after you are comfortable in the brace.
3. Report skin problems to your doctor or nurse, who may suggest alternate skin care technique.
4. Make an earlier clinic appointment if brace or skin problems persist.
5. Be sure you and your family understand how to apply the brace, proper skin care and how to judge tolerance to it.
6. Be sure there are no wrinkles in material under the brace or in the lining of the brace.
7. Initially, the brace may be loosened slightly during meals if needed. Eating smaller portions more frequently may help.
8. Your orthopedic surgeon is: _____.
9. Your orthotist is: _____.
10. Your physical therapist is _____.

WHAT CAN YOU DO IN YOUR BRACE?

Almost anything you want to try in your brace is alright - basketball, baseball, horseback riding, gym, tennis. You can swim in your brace too, if need be, so don't be afraid of falling in when you're sailing. If you swim in the salt water, wash the brace well with fresh water, then towel dry it. Generally you will be swimming without your brace since the water will support you. Check with your doctor for specific instructions about swimming.

SCOLIOSIS EXERCISE PROGRAM
GROUP I

BASIC EXERCISE PROGRAM IN BRACE.

(These exercises are to be done as frequently as possible.
These are to be done in sequence.)

1. Lumbar flexion (pelvic tilt) while standing.

- a. Relax the knees; press low back flat against the brace by tightening the lower abdominal muscles and gently squeezing the buttocks together.

2. Spinal distraction.

While holding pelvic tilt, elongate the spinal column as much as possible. (Stand tall!)

3. Correction of major curve.

In position attained by exercises 1 and 2, now shift trunk backward and toward the spine (away from the pads).

Group II

ADDITIONAL EXERCISES IN THE BRACE. DO ONLY THOSE INDICATED FOR YOU, TWICE DAILY.

1. Lumbar flexion (pelvic tilt) with knees bent.

- a. Keep the shoulders flat on the floor and the chest elevated, but breathe regularly.
- b. Tighten the buttock muscles.
- c. Press the low back flat by tightening and pulling the lower abdominal muscles flat.

2. Lumbar flexion (pelvic tilt) with knees straight.

Repeat a, b, and c above.

_____ 3. Spinal extension.

- a. Lie with forehead on floor and right left both arms placed diagonally overhead.
- b. Tilt pelvis.
- c. Raise shoulder(s) and head about 6" off the floor. Do not arch the neck, but remain looking directly at the floor. (Progression is to place resistance between the shoulder blades.)

_____ 4. Hip flexor stretch.

- a. Pull both knees as far toward shoulders as possible.
- b. Hold right knee tightly against chest while slowly extending left leg to floor.
- c. Tilt pelvis and hold.
- d. Press left leg downward.
- e. Repeat with opposite leg.

_____ 5. Shoulder stretch.

- a. Stand in open doorway with arms elevated and resting with thumbs against the frame.
- b. Complete Group I exercises.
- c. Lean into the doorway feeling a stretch in the front of the shoulders.

_____ 6. Other.

EXERCISES OUT OF THE BRACE. DO ONLY THOSE INDICATED FOR YOU,
10 TIMES EACH.

_____ 1. Knee to chest stretch.

Position: Lie on back with knees bent and feet flat, arms at side.

Action: Without raising head, bring both knees up and grasp with hands below the knee joint, one knee in each hand. Separate knees and then pull each knee as close to the shoulder as possible, lifting buttocks slightly. Relax and straighten arms but do not let go of them. Repeat.

_____ 2. Curl up.

Position: Lie on back with knees bent and feet flat, arms at side.

Action: Do a pelvic tilt and hold it. Reach both hands toward knees, tuck chin to chest, lift shoulders and "curl up" toward a sitting position. Go as far as possible keeping the feet flat. Hold for a slow count of 5 and then slowly uncurl to starting position and relax. Repeat.

_____ 3. Hamstring stretching.

Position: Sitting with upper body and legs straight and head bend forward slightly.

Action: Tighten stomach muscles and slowly reach hands to touch toes. Return to upright position and then repeat the exercise.
Do NOT lean backwards on hands.

_____ 4. Lateral bending of the spine sitting standing.

a. Complete Group I exercises.

b. Place left right hand against ribs at _____ level.

c. Raise opposite arm overhead and bend across the right left hand.

_____ 5. Group I exercises.

6. From Group II exercises:

7. Other.

APPOINTMENTS

When you make a clinic appointment, please identify yourself as a scoliosis patient. This will assist us in making your visit as convenient as possible.