

# Wunzi™ Strapping Applications



In addition to the basic garment set(s), all Wunzi product configurations now include limb cuff and strapping options that attending therapists can use to achieve higher levels of trunk alignment and limb positioning, as well as increased postural control.

## TYPICAL STRAPPING OBJECTIVES:

- Enhance torso alignment achieved with the Wunzi™ base garments
- Improve resting and functioning joint alignment at the hips and/or knees and/or shoulders
- Provide strong proprioceptive input to improve body awareness.

## STRAPPING COMPONENTS:

Also the specific parts in your system will vary by product size and configuration, generally the strapping components consist of:

- Limb cuffs in one or more sizes. (Fig. 1)
- Split Straps in two or more sizes. (Fig. 2)
- Cross Straps in one or more sizes. (Fig. 2)
- GoldTone Straight Straps, typically used to optimize alignment. (Fig. 3)
- A variety of ultra-strong Velcro® strapping tabs. (Fig. 4)

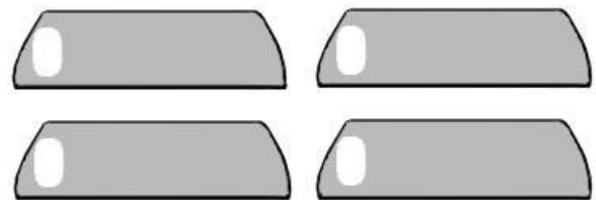


Fig. 1 Limb cuffs anchor limb straps

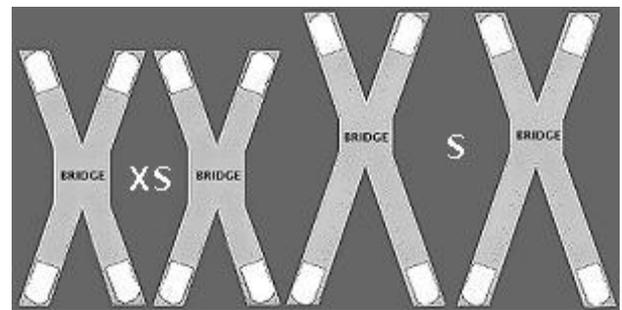


Fig. 2 Split Straps – Sizes XS & S - used to optimize alignment.

(Pic here)

Cross Straps – Use with caution on infants.



Fig. 3 GoldTone Straight Straps are used to align limb segments.

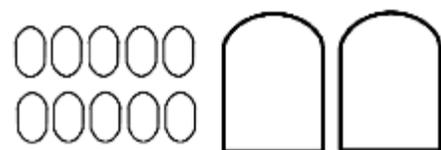


Fig. 4 Strong Velcro® strapping tabs

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## Strapping Components and Properties

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The three strapping materials included in the Limb Kit provide different qualities of stretch, resistance to stretch, and rebound:

- **CROSS STRAP** - the white, elastic “X” strap offers the most stretch and a range of strengths of rebound that relate to the amount of tension imposed on the strap.

**SAFETY PRECAUTION:** This TogRite material is too strong to wrap completely around the extremities of infants and small children. However, it can be very effective in assisting underlying muscles to align the trunk and proximal limb joints when used as directed in this document.

- **SPLIT STRAPS** - cut with a center bridge and 4 attachment points from foam-lined GoldTone material - provide alignment and limb positioning assistance with moderate stretch and rebound.
- **STRAIGHT STRAPS AND LIMB CUFFS** - cut from foam-lined GoldTone material - offer little stretch and rebound, and are used to deliver sensory input and relatively firm positioning. The Straight Straps are typically used to optimize alignment.

The following procedures illustrate a selection of strapping applications using one or two of the available straps. The suggested applications are suggestions intended to help the clinician to get started with safety and reasonable effectiveness. All applications are subject to further tuning, changes in strap choice and orientation, and other therapist innovations.

### Note:

Applying the Wunzi garment *backwards* – placing the large panel on the infant’s front, so that the embedded Velcro closures attach in the back (Fig. 5) – can sometimes improve results (and garment durability).

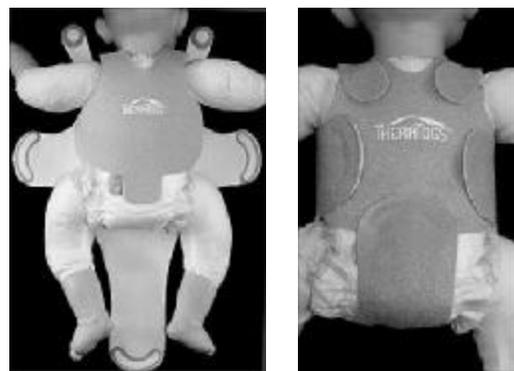


Fig. 5 *Wunzi garment applied backwards for extension.*

How? Doing so reinforces extension strapping applications by positioning them in the same direction as the garment closures – in effect, the closures and the strapping attachment points “pull together” to reinforce each other.

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# Trunk, Scapular, & Hip Strapping Strategies for Pre-Ambulatory Infants

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## Improve Trunk Extension

*These procedures are the 1<sup>st</sup> priority for infants who lack bilateral, symmetrical, antigravity trunk extension strength and control.*

### SPINAL EXTENSION ASSIST USING SPLIT STRAPS

1. Choose a Split Strap. With the child tummy-lying, lay the Split Strap vertically on the body with the bridge over the upper peak of the targeted spine curve. (Fig. 6).
2. Wrap the top 2 strap ends over the shoulders and attach them to the front panel. Fold ends under if they are too long during fitting, and cut to fit when satisfied.
3. Manually reduce excess trunk flexion *without force*. Draw the lower strap ends down toward the pelvis (Fig. 7). Align the bridge over these sites:

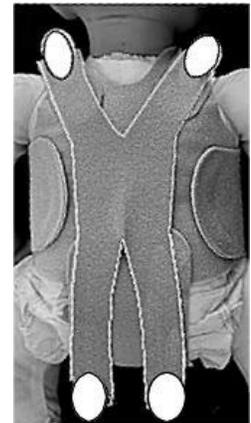


Fig. 6 Lay Split Strap on spine

4.
  - Thoracic or thoraco-lumbar flexion curve (Fig. 8).
  - Flat lumbar spine: Lay a Split Strap XS across the midback. Attach top two ends to the upper, outer rib cage. With the back extended, draw bottom two straps downward, and tab to the front panel near the hip joints (Fig. 9).
  - Thoracolumbar flexion curve: Combine applications as needed (Fig. 10).



Fig. 7 Manually facilitate extension

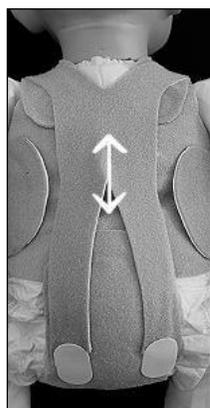


Fig. 8 Thoracic or Thoracolumbar curve

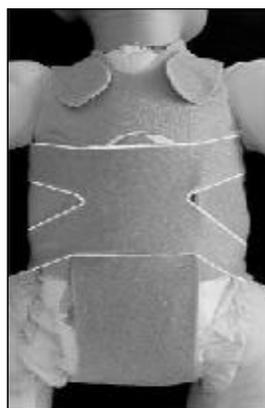


Fig. 9 Flat Lumbar spine – back & front views

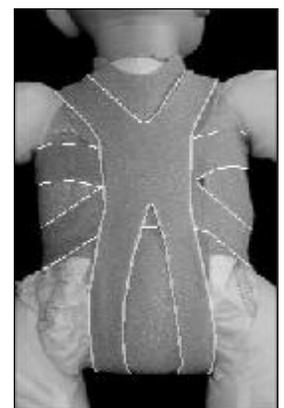
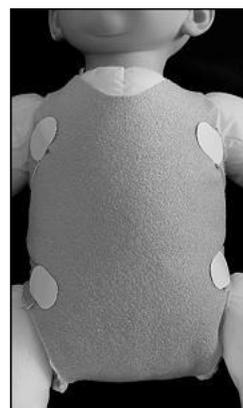


Fig. 10 Thoraco-lumbar combination

5. Assess for effect, fit, and comfort.
6. Adjust strap length, attachment sites, and tension as needed.
7. Try similar applications using the TogRite Cross Strap to compare results.
8. Mark attachment sites to assure caretakers of correct strap placement.
9. Train the caretaker to attach the strap to marked sites.

## STABILIZE SCAPULA - WITH UPPER TRUNK EXTENSION USING SPLIT STRAPS

1. If strapping both sides, size and select 2 Split Straps.
2. With the child tummy-lying, lay the Split Strap so that the bridge will lie over the scapula when the top 2 ends are attached to the front of the garment (Fig. 11).

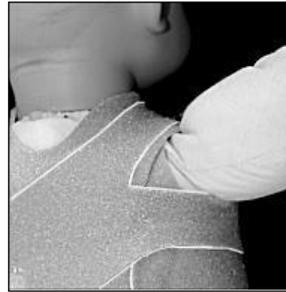


Fig. 11 *Strap bridge over scapula*

3. Wrap the top 2 ends over and under the shoulder and attach them to the front of the Wunzi garment (Fig. 12).
4. Manually retract the shoulder & scapula without force while drawing the lower strap ends diagonally down and across the trunk (Fig. 12). Attach them to the garment to optimize age-appropriate scapular stability and alignment (Fig. 13).



Fig. 12 *Correct alignment while drawing strap down and across.*

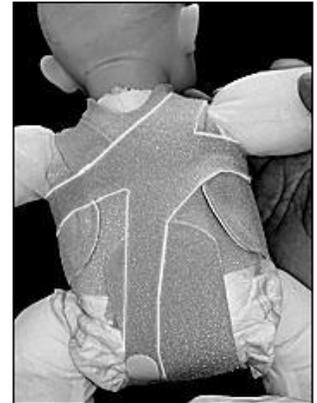


Fig. 13 *Secure lower strap ends to capture opposite scapula and assist with scapular depression*

5. Assess for effect, fit, and comfort. Adjust strap length, attachment sites, & tension as needed.
6. Try the same procedure using the Cross Strap to compare effects.
7. Cut off excess straps or strap length to facilitate future applications.
8. Using Split Straps, repeat on the other shoulder if needed (Fig. 14).
9. Mark attachment sites and train caretakers to place the strap(s) correctly.



Fig. 14 *Strap both sides if needed.*

## Torso Strapping to Shorten & Assist Abdominal Muscles

These procedures might be used to complement trunk extension strapping. If a flexion deficit is the main concern, apply the Wunzi garment with the small panel in front with all closures on the front side (Fig. 15).

Then, choose among these strapping options illustrated in detail below:

- **Positioning assistance with sensory awareness:** Use a small GoldTone Split Strap.
- **Elastic muscle assist with sensory awareness:** Use the TogRite Cross Strap provided with the Wunzi base system (or 2 separate pieces of TogRite).



Fig. 15 Apply the garment to support flexion – small panel and closures in front.

### SPLIT STRAP APPLICATION – TORSO ONLY

1. Turn a Split Strap “S’ foam side up with the short ends on top. Lift the pelvis to flex the lower spine and attach the upper 2 (short) strap ends to the crotch back side of the crotch panel (Fig. 16).
2. Draw the long strap ends upward and attach them to the garment on the upper trunk or back (Fig. 17).
3. Assess for effect, fit, and comfort. Adjust strap length, attachment sites, and tension as needed.

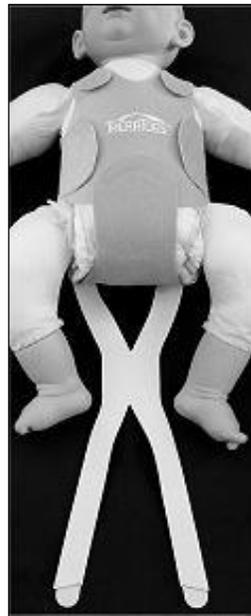


Fig. 16 Attach short ends to the crotch panel.

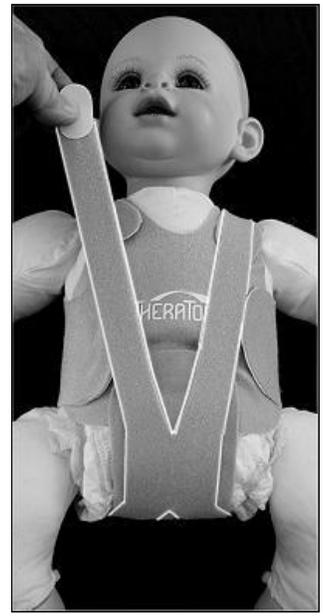


Fig. 17 Draw long ends up and attach.

## TOGRITE CROSS STRAP APPLICATION – TORSO ONLY

1. Repeat previous procedure using a Cross Strap, aligned vertically (Figs. 18-19).
2. Assess for effect, fit, and comfort. Adjust strap length, attachment sites, and tension as needed.



Fig. 18 *Attach short ends to the crotch panel.*



Fig. 19 *Draw long ends up and attach.*

## Improve Trunk & Hip Flexion (FLX) with Hip Lateral Rotation (LR)

*These applications are for the child who shows excessive trunk extension and who needs no extension assist.*

### FLEXION & HIP LR ASSIST WITH POSSIBLE REFLUX REDUCTION

#### Split Strap Size “small”

1. Wrap the larger Limb Cuffs around the lower thighs, just above the knees (Fig. 20).
2. With the infant lying on his back, lay the small Split Strap on the body with short ends uppermost and the bridge over the upper sternum.



Fig. 20 *Wrap limb cuffs around thighs.*



Fig. 21 *Lay Split Strap on torso & attach strap ends above scapulae.*

3. Attach the short strap ends to the garment beside the neck or above the scapulae (Fig. 21). Attach tabs to the lower strap ends.

4. Lift a thigh into hip flexion (FLX) and lateral rotation (LR) (Fig. 22).
5. Wrap the long strap end under the inner thigh cuff and attach the strap to the *outer-front* of the thigh cuff (Fig. 23).
6. Repeat on the other side (Fig. 23).
7. Assess for effect, fit, and comfort. Adjust strap length, attachment sites, and tension as needed.
8. Monitor reflux status.



Fig. 22 *Position each thigh into hip flexion with lateral rotation.*



Fig. 23 *Attach lower strap ends to outer side of thigh cuff.*

## **FLEXION & HIP LR ASSIST WITH POSSIBLE REFLUX REDUCTION – USING A CROSS STRAP**

Repeat the procedure described above with the Cross Strap aligned vertically (Fig. 24).



Fig. 24 *Same application using the Cross Strap*

## Reduce Floppy Hip Abduction with Lateral Rotation (LR)

*Address torso alignment and stability before positioning the extremities.*

1. Apply Limb Cuffs to the lower thighs with closure tabs on the outside surface (Fig. 25).
2. With the child lying on his back, select a Split Strap (shown) - or the Cross Strap - and attach the top 2 ends to the upper trunk (Fig. 26).



Fig. 25 *Wrap limb cuffs around thighs.*



Fig. 26 *Lay Split Strap on torso & attach strap ends above scapulae.*

3. Lift a thigh into FLX, adduction (ADD), & medial rotation (MR) (Fig. 27).
4. Bring a lower strap end outside and under the thigh cuff (Fig. 27). Attach it to the under-inner side of the thigh cuff to hold hip in FLX, ADD & MR (Fig. 28).
5. Repeat on the other side (Figure 28).
6. Assess for effect, fit, and comfort. Adjust strap length, attachment sites, and tension as needed.



Fig. 27 *Wrap lower strap end around outer thigh cuff, attach to under-inner side.*

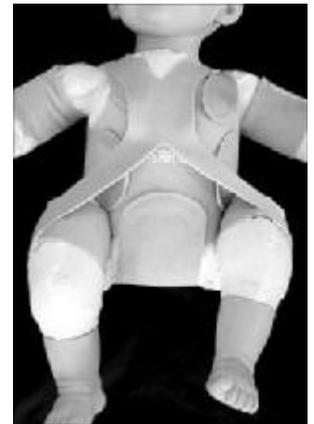


Fig. 28 *Repeat on the other side.*

7. Attach a length of Straight Strap across the fronts of both thighs if more control of abduction is needed, or as an alternative strapping strategy. (Fig. 29)
8. If adduction and MR are the goal, and assisting FLX is not important, just use the limb cuff across the thighs as shown in Figure 25.



Fig. 29 *For more control, attach a Limb Cuff or a length of the Straight Strap over the outer -anterior thighs.*

## Lumbar Spine Extension with Hip Flexion & Lateral Rotation

*These applications are for the child who lacks the full-term newborn's Iliopsoas (IP) contracture – a key factor in early spine and hip development.*

### CROSS-STRAP ILIOPSOAS (IP) MUSCLE ASSIST – LUMBAR EXT WITH HIP FLX, ABDUCTION, AND LATERAL ROTATION

1. Apply Limb Cuffs to lower thighs with tab closures on the outside.
2. Turn the Cross Strap sideways and lay the bridge across the child's mid-back (Fig. 30).
3. Size and attach the upper 2 strap ends to the outer thorax near the axillae (Fig. 31).
4. Turn the child onto his back and position one hip in FLX and LR (Fig. 31).
5. Wrap each lower strap end around the inner thigh and attach to the underside of the cuff (Fig. 32).
6. Use a small tab to anchor the hip strap on the thigh cuff to resist strap bunching in the groin (Fig. 32).

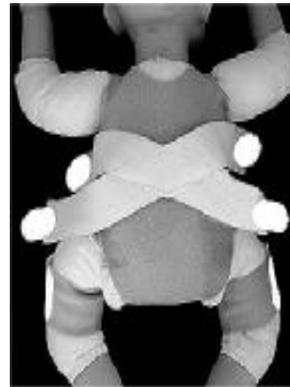


Fig. 30 Lay a Cross Strap sideways across the mid-back



Fig. 31 Attach the top ends of the Cross Strap to the front thorax



Fig. 32 Wrap the lower ends of the Cross Strap over the inner thigh and attach to the back of the limb cuff.

### GOLDTONE STRAIGHT STRAP IP MUSCLE ASSIST

1. Lay a GoldTone Straight Strap on a surface with the foamed side up with a tab attached to one end.
2. Lay the child face-up with his mid-spine on the strap.
3. Lift a thigh. Wrap the tabbed strap end over the
4. flexed hip joint & under the inner thigh cuff (Fig. 33).

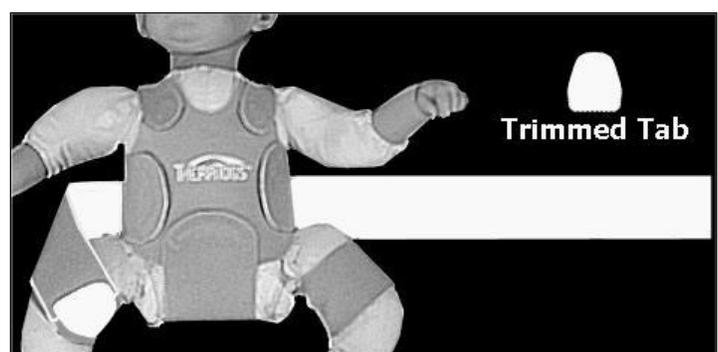


Fig. 33 Attach a Straight Strap end to an inner thigh cuff.

5. Trim the free end of the tab to reduce the likelihood of the hook side contacting skin and attach it to the inner thigh cuff (Fig. 34).



Fig. 34 Trim the tab if need to prevent skin contact.

6. Draw the straight strap toward the other side to secure the attached end (Fig. 35).



Fig. 35 Draw slack from the strap, but don't overstretch.

7. Bring the free strap end over the second hip toward the inner thigh. Size and cut to fit (Fig. 36).

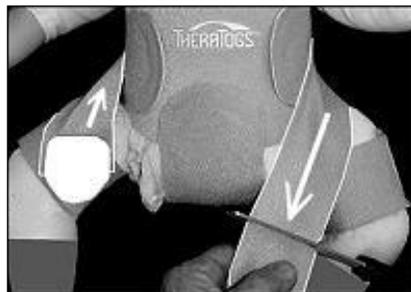


Fig. 36



Fig. 37

8. Trim the 2<sup>nd</sup> tab as needed (Fig. 34, previous).

9. Wrap the strap under the inner thigh cuff and attach it (Fig. 37).

10. Assess for effect, fit, and comfort. Adjust strap length, attachment sites, and tension.

11. Consider adding a length of a Straight Strap to reduce excess abduction, if needed (Fig. 38).

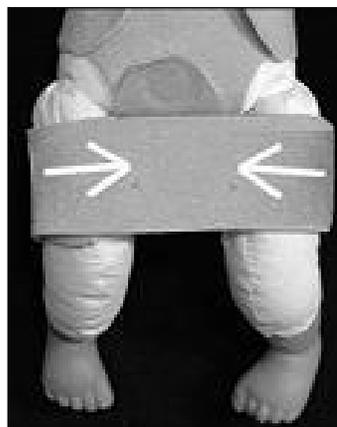


Fig. 38

12. Assess effect on sitting by tabbing the back center of the strap to the garment (Fig. 39).

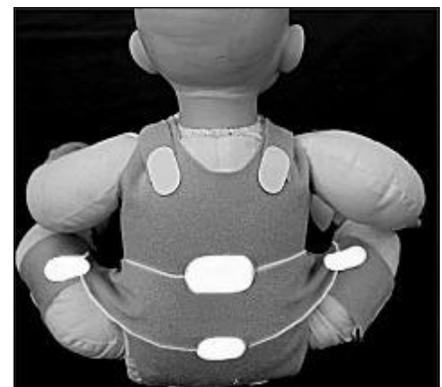


Fig. 39

13. Add small tabs to secure the straight strap to the thigh cuffs to minimize bunching in the groin.

## Assist Hip Extension with Abduction and Lateral Rotation

*These procedures are designed for the child who struggles to resist stiff hip FLX and ADD postures.*

### SINGLE SPLIT STRAP APPLICATION FOR BOTH HIPS

1. Apply Limb Cuffs to the lower thighs with closure tabs on the inner side of the thighs.
2. With the child lying on his tummy, lay a Split Strap "XS" across the upper pelvis (Fig. 40).
3. Attach the top 2 ends to the upper trunk (Fig. 41).
4. Manually align the hip *without force* and attach the lower strap to the thigh cuff. Repeat on the other side (Fig. 41).

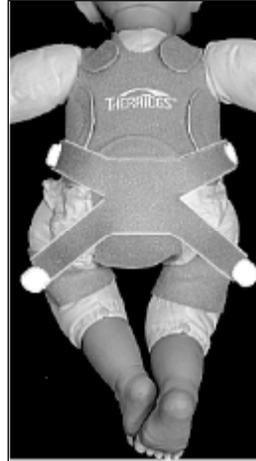


Fig. 40 Lay Split Strap XS across upper pelvis.



Fig. 41 Align the hip and attach the lower strap end.

5. Assess for effect, fit, and comfort. Adjust strap length, attachment sites, and tension as needed. If not satisfied, consider trying two split straps (*shown in the next procedure*).

### SPLIT STRAP APPLICATION FOR ONE HIP – WITH OR WITHOUT ADDING TRUNK ALIGNMENT ASSIST

1. Apply Limb Cuffs to the lower thighs with the closure tabs on the back side (Fig. 42), lay the child on her tummy.
2. Size, select, and lay a Split Strap diagonally across the targeted hip joint, with the bridge covering the buttock (Fig. 43). Strap size "S" can be used to add trunk alignment assist, if desired.
3. Attach the bottom 2 ends to the front of the thigh cuff (Fig. 43).

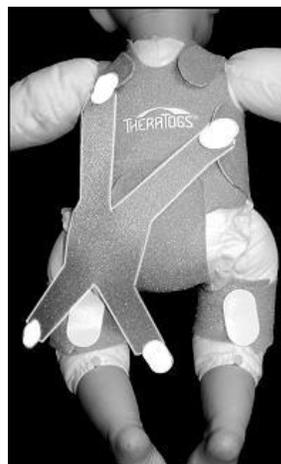


Fig. 42



Fig. 43

4. Manually align the hip *without force* and attach the one upper strap to the garment.
5. Repeat on the other side if strapping both hips (Fig. 44).
6. Assess for effect, fit, and comfort. Adjust strap length, attachment sites, and tension as needed.

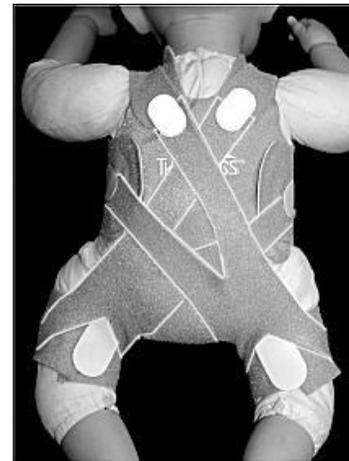


Fig. 44

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## Advanced Strapping Applications

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There are more strapping procedures that you can use to promote the acquisition of resting and functioning alignments that are seen in and used by typically-developing infants, including:

- Knee flexion and medial rotation (MR) assist.
- Hip ABD with EXT and LR for weight shifts - for the ambulatory child who lacks hip abduction range of motion (ROM), or who shows muscle weakness that interferes with competent weight shifting over the knees or feet.
- Reducing shoulder protraction with Medial Rotation (MR).
- Facilitating shoulder flexion and scapular stabilization.