

Splinting and Bracing **EXAMPLES**



X-LITE[®] CLASSIC

X-LITE[®] PREMIUM

3D-LITE[™]

Airy and lightweight

GENERAL INFORMATION

These examples are offered as fabrication ideas only. There are many different ways to make a TLSO, Wrist splint, Casting etc. Always make sure that the orthosis that you have constructed has the stability required to achieve your treatment goals. Always check that all edges on the brace are smooth.

CAUTION: Take appropriate precautions to prevent burns when using hot water and heat guns.

TECHNOLOGY

X-LITE® is the only low temperature thermoplastic, which starts as a 100% natural cotton mesh which is then impregnated with a non-toxic resin base, making it totally biodegradable. 3D-LITE™ is produced in the same way, but uses a polyester mesh as the base.

EXCELLENT VENTILATION

The cotton mesh base provides "natural" opening for heat or fluids to escape.

LIGHTWEIGHT

With the copolymer added only to the cotton mesh itself, X-LITE® offers the lightest weight casting and splinting materials available.

NON-TOXIC

The polymer in X-LITE® is fully reacted, which means that it does not contain any of the residues in unreacted form and therefore will not release such residues when applied or worn.

BIODEGRADABLE

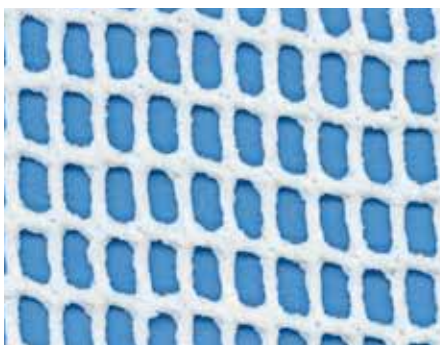
This is an important benefit for those of us who are concerned about the future of our environment. The Microbial Ecology Laboratory, University of Liege, Belgium, studied X-LITE® and stated: "...we are pleased to conclude: Runlite X-LITE® Thermoplastic Products are in full conformity with the French and U.S. standards for biodegradability".

X-RAY TRANSLUCENT

X-LITE® and 3D-LITE™ are completely translucent to x-ray and will not show at all on the negative, unless using more than three layers.

PRODUCT OPTIONS

X-LITE® CLASSIC



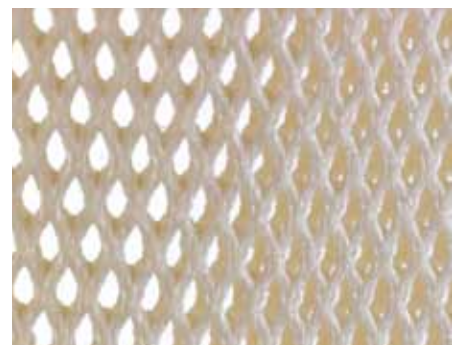
CLASSIC is the original X-LITE® material. The large mesh openings are great for larger anatomy and when the injury requires maximum aeration, i.e., burns.

X-LITE® PREMIUM



PREMIUM is made of the same cotton mesh but thinner and with smaller openings. This makes Premium ideal for pediatrics and small adult anatomy, particularly hand splinting.

3D-LITE™



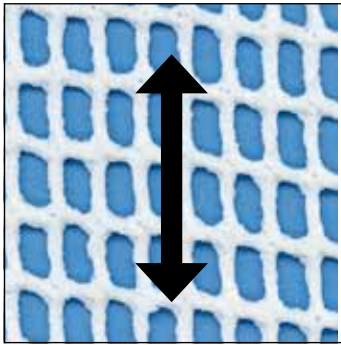
3D-LITE™ is the newest material in the range of products. This unique three dimensional material is perfectly suited for larger applications, such as spinal braces.

TEMPERATURE AND WORKING TIME

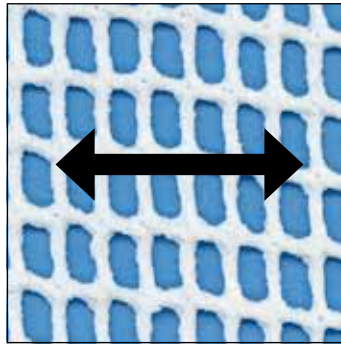
WORKING/SETTING TIME				
IMPORTANT: Water temperature must be approx. 70°C (160°F)				
	Heating time	Working time	Cooling time	Load bearing time
<i>Classic Splint</i>	1 minute	45 - 60 seconds	60 - 75 seconds	
<i>Premium Splint</i>	1 minute	30 - 45 seconds	45 - 60 seconds	
<i>Classic cast</i>	2 minute	2 - 3 minutes	4 - 15 minutes	15 - 20 minutes
<i>Premium Cast</i>	2 minutes	60 - 90 seconds	3 - 5 minutes	
<i>3D-lite</i>	2 minutes	2 - 3 minutes	4 - 15 minutes	10 - 20 minutes
<i>Edging material</i>	10 - 15 seconds	15 - 20 seconds	5 - 10 seconds	
<i>Thermoplastic hook</i>	15 - 20 seconds	20 - 30 seconds	15 - 20 seconds	

STRETCH AND RIGIDITY

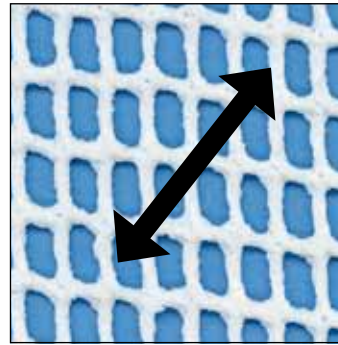
X-LITE® CLASSIC AND PREMIUM STRETCH



Minimum

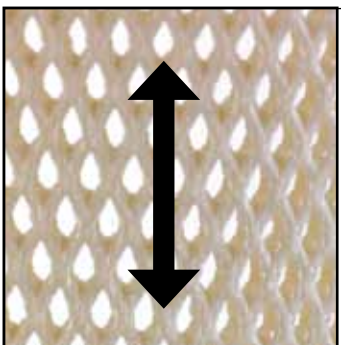


Moderate

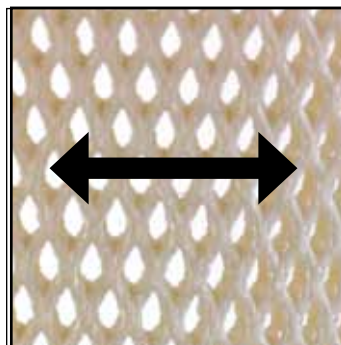


Maximum

3D-LITE™ STRETCH



Minimum



Maximum

OPTIMUM STRENGTH



Flip layers so holes do not perfectly align.

OPTIMUM AERATION



Align the holes as you lay the layers together.

TLSO Fabrication Examples

PREPARATION

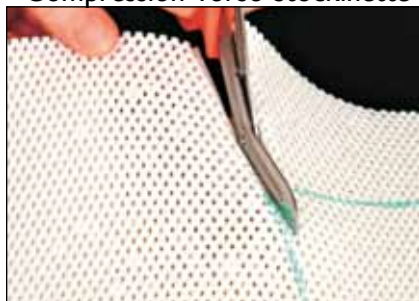
- 1 sheet of 3D-LITE™ material
- Pattern
- Buckles (4 pcs)
- 2.5 cm (1") wide X-LITE® edging material
- Hook/loop straps for closure (4 pcs)
- Compression Torso Stockinette



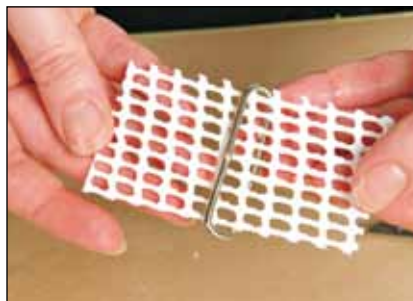
1. Try pattern onto patient and make necessary adjustments.



2. Draw pattern onto material



3. Immerse material into water and then cut with sharp scissors.



4. Prepare buckles (see page 18)



5. Immerse sheet into water until soft and remove excess water on a towel. Mold onto patient. Repeat the same procedure for the back section.



6. Trim any excess material while still soft, leaving 5 cm (2") overlap.



7. Check overlap for good fit.



8. Heat small sections of edge in water bath or with heat gun and press edges together.



9. Press edges together and cool to seal.



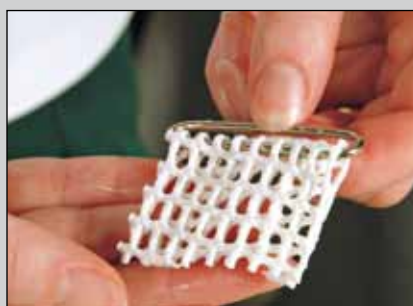
10. Cover edges with material of your own preference or use X-LITE® edging material. See page 17 for further information.



11. Immerse the prepared buckles into water.



12. Take buckles out from water and fold.



13. Press material firmly together.



14. Heat the brace where the buckle should be placed.



15. Press heated buckles into place. Repeat procedure with remaining buckles



16. Check straps for proper length.




17. Fasten straps with stapler or other suitable method.



18. Secure straps and trim excess.



19. Final brace - check for proper fit.

 Extreme caution should be taken when using the heat gun as the material will be extremely hot.

Tibia Fracture Brace Fabrication Examples

PREPARATION

- 3 sheets X-LITE® Classic 45x50 cm (18"x20")
- 5 sheets X-LITE® Classic 2.5 cm (1")
- Pattern
- Felt Padding
- Aquaplast (or similar) for foot piece
- Buckles (4 pcs)
- Ankle rivets (2 pcs)
- Straps (2 pcs)
- Compression stockinette
- Elastic bandage



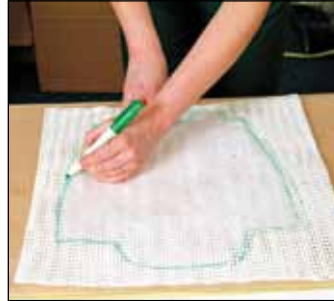
1. Try pattern on patient and make necessary adjustments.



2. Prepare the three sheets of X-LITE® - the middle sheet should be flipped in the opposite direction for increased rigidity.



3. Hold the three sheets together and immerse in water for a few seconds to adhere together.



4. Draw pattern onto material.



5. Heat areas to cut in water to soften and then cut.



6. Cut the foot piece reinforcement and stirrup from the Aquaplast or similar material.



7. Prepare the buckles (see page 18) and the ankle rivets (see page 19).



8. Soften 2.5 cm (1") X-LITE® in the water and apply around edge of brace. At the end of one strip, overlap the next to ensure edges don't pull apart when moulding.



9. Heat edges one by one in water bath.



10. Hold a rolling pin at a slight angle and press firmly on the covered edges ONLY to create a smooth finish.



11. Immerse all the buckles and posts into water.



12. Place the buckles and rivets in their position on the brace and press them into place.



13a. Prepare the patient by adding extra padding material over the malleoli.



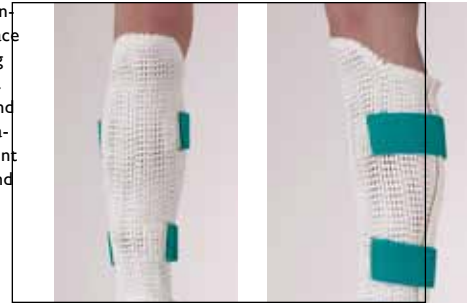
13b. Before applying the brace onto patient, apply enough talcum powder to posterior overlap edges to prevent from sticking together.



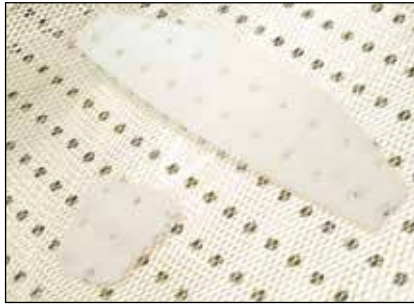
14. Immerse brace into water. Mold onto patient's leg wrapping laterally to medially.



15. Wrap elastic bandage around the brace on the leg, wrapping laterally to medially. Straighten the leg and shape around the patella to ensure patient will be able to extend knee when brace is completed.



16. Check fit in standing position.



17. Immerse foot piece reinforcement and stirrup into water - remove when sufficiently softened.



18. Place the foot piece reinforcement onto the stirrup in the heel area. Put talcum powder onto the ends to avoid sticking together.



19. Place the foot piece under the foot and bring the stirrup side up. Press the top of the stirrup firmly against the exposed rivets to get a good protruding mould.



20. When the stirrup has cooled - use a sharp knife to remove the material covering the holes.



21. Place the uprights of the stirrup onto the rivets and secure with the locking cap.



22. To avoid pressure over the malleoli, add self-adhesive felt padding.



23. Foot piece completed.



24. Position the straps and trim to appropriate length.



25. Attach the straps to the underlying side, using heavy duty staples or other suitable method.



Humeral Fracture Brace Fabrication Examples

PREPARATION

- 3 sheets X-LITE® Classic or Premium 45 X 50 cm (18" x 20")
- 4 - 6 sheets X-LITE® Classic or Premium 2,5 cm (1")
- Compression stockinette
- Felt Padding
- Straps (2pcs)
- Elastic bandage



1. Try pattern on patient and make necessary adjustments.



2. Prepare the three sheets of X-lite - the middle sheet should be in the opposite direction for increased rigidity.



3. Hold the three sheets together and immerse in water for a few seconds to adhere together.



4. Draw pattern onto material.



5. Heat areas to cut in water to soften and then cut.



6. Using 2,5 cm (1") X-LITE®, heat these strips in the water and apply around edge of brace. At the end of one strip, overlap the next to ensure edges don't pull apart when moulding.



7. Heat edges one by one in water bath.



8. Hold a rolling pin at a slight angle and press firmly on the covered edges ONLY to create a smooth finish.



9. Put the buckles into place (for more information about buckles - see page 18). After placing the buckles - immerse the brace into water to make it soft.



10. Before applying the brace onto patient, apply enough talcum powder to overlap edges to prevent sticking together.



11. Mold the brace onto the patient wrapping from anterior - posterior - medial.



12. With hand supported, help patient lean toward the fracture side, allowing the fracture site to hang vertically while maintaining fracture alignment.



13. Use elastic bandage to wrap around the brace on the arm, wrapping laterally to medially.



14. Add self-adhesive felt padding to avoid pressure on the humeral head.



15. Felt padding in place.



16. Position the straps and trim to appropriate length.



17. Attach the straps to the underlying side, using heavy duty staples or other suitable method.



18. Cut straps to correct length.



19. Finished brace.



X-LITE® Premium Humeral Fracture Brace



X-LITE® Classic Humeral Fracture Brace

Wrist Splint Fabrication Examples

PREPARATION

X-LITE® Classic

- 2 sheets size 20 x 37.5 cm (8" x 15")
- 2 sheets size 2.5 cm (1")
- 10 cm (4") X-LITE® Edging material 2,5 cm (1") (for thumb part)
- Thermoplastic hook
- Stockinette
- Straps

X-LITE® Premium

- 2 sheets size 20 x 37.5 cm (8" x 15")
- 1 sheet cut into 2.5 cm (1") strips
- 10 cm (4") X-lite Edging material 2,5 cm (1") (for thumb part)
- Thermoplastic hook
- Stockinette
- Straps



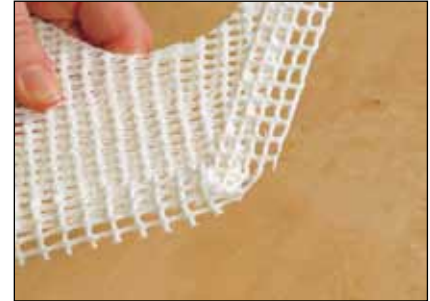
1. The stockinette is optional depending on therapist preference or patient medical needs.



2. Hold the two sheets together and immerse in water for a few seconds to adhere together.



3. Draw pattern onto material. Heat areas to cut in water to soften and then cut.



4. Using 2.5 cm (1") X-lite, heat these strips in the water and apply around edge of brace. At the end of one strip, overlap the next to ensure edges don't pull apart when moulding.



5. Heat edges one by one in water bath. Using a rolling pin compress only the covered edges firmly to create a smooth finish.



6. Immerse brace into water until soft and then remove excess water on a towel. Mould onto patient.



7. Adjustments can easily be made by immersing sections to be modified into water.



8. Start moulding on the patient again until satisfied.



9. Extra re-inforcement can be added by using strips from left over material. Immerse into water and apply on brace where added rigidity is required.



10. Cut re-inforcement to proper length.



11. Add edging material on the the thumb area of the brace for extra smoothness and comfort. See page 17 for more instructions.



12. To fit contours make small cuts into material and fold. If edging material becomes dry, immerse into water to re-soften.



13. Make sure the edging material is well secured into material.



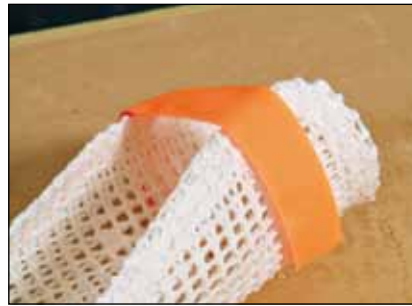
14. Use heat gun to soften the area on the splint where the thermoplastic hook is to be applied.



15. Use heat gun to soften the thermoplastic hook (8-10 sec.).



16. Press the Thermoplastic hook firmly into the brace.



17. Attach the straps to the hook and trim to appropriate length.



18. Finished brace with all straps in place.

X-LITE® Options

These instructions offer a few splint variations. The versatility of X-LITE® allows you to modify to meet your specific therapeutic needs. Any of the instructions included can be modified, for examples:

- Use of stockinette is optional. X-LITE® may be applied directly to the skin if desired.
- Edges may be finished using
 - a) X-LITE® edging material
 - b) X-LITE® classic available in 2.5 cm (1")
 - c) Cut X-LITE® Premium by width and length desired

Using a rolling pin to smooth the material is only required when optimal smoothness is needed.

Use of pattern is optional.



Thumb Orthosis Fabrication Examples

PREPARATION

- X-LITE® of suitable width and length to cover affected anatomy.
- X-LITE® Edging Material
- Strap
- Thermoplastic hook



1. Cut X-LITE® to the shape of your pattern and immerse into water.



2. If necessary cover thumb area with stockinette. Mold thumb orthosis on patient.



3. Immerse the edging material into water. Apply the edging material around the orthosis.



4. Cut off excess material and fold to the inside. If needed immerse shortly into water.



5. Repeat the edging procedure and apply around the thumb area.



6. To fit contours make small cuts into material and fold. If edging material becomes dry, immerse into water to re-soften.



7. Press the edging material well into the X-LITE® and let cool.



Cast Roll Preparation



Use tongs to immerse and remove the roll from the water heater.



Place the roll on a towel to allow it to drain. Hold the roll by the label and gently shake to remove any excess water.



Remove Outer Wrap. Pull to start separation of X-LITE® from plastic film. Most practitioners find it is easiest to keep the plastic film on top as the cast roll is applied to the patient.

Circular Leg cast

PREPARATION

- Approx. 3 rolls X-LITE® Classic 10 cm (4")
- Approx. 1 roll X-LITE® Classic 7.5 cm (3")
- Stockinette
- Foam padding



1. Prepare the toe-part from a 7,5 cm (3") roll and put into water heater.



2. Cover the leg with stockinette and foam padding.



3. Apply the first roll of 10 cm (4") roll. Start approx. 2 cm (1") below the knee. Work your way downwards. Make sure you have at least two layers or more, especially where load will be applied (heel area and achilles tendon).



4. Go back and forth under the foot and heel, to avoid pressure over the instep. Finally put the toe cover in place.

Circular Arm cast

PREPARATION

- Approx. 2 rolls X-LITE® Classic 7,5 cm (3")
- Stockinette
- Foam padding



1. Prepare the wrist part from a 7.5 cm (3") roll as shown above.



2. Cover the arm with stockinette and foam padding.



3. Start with applying the wrist part into the palm area. Twist the roll half way when you pass the thumb area. Work your way upwards towards the elbow.



4. Finish by pulling back the stockinette for a 2 cm (1") overlap. Smoothen the cast with water.

Attaching Thermoplastic Hook

PREPARATION

- X-LITE® Thermoplastic Hook
- Strap in suitable length



1. Cut off a suitable piece of the Thermoplastic hook material.



2. Apply dry heat to back side until sticky.



3. Apply dry heat for a few seconds to the spot on the splint where the hook is to be attached.



4. Press the Thermoplastic hook firmly into the orthosis and let cool.



5. Attach the Velcro loop strap.

Edging

PREPARATION

- X-LITE® Edging material of suitable width and colour.



1. Cut X-LITE® Edging Material to desired width and length.



2. Immerse into water until soft.




3. Apply the edging material onto the orthosis.



4. For curved areas of the splint, make small slits into the unattached half of the tape. This will make it easier to fold the tape to the underside.



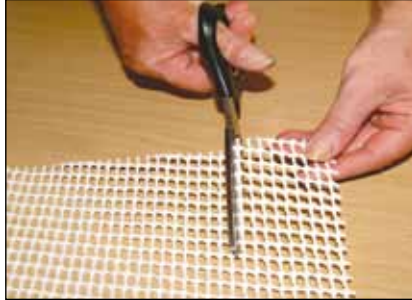
5. Fold and press. If the material has cooled down too quickly, immerse into water again and then press to the underside.

 Extreme caution should be taken when using the heat gun as the material will be extremely hot.

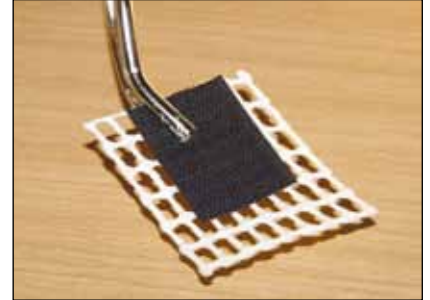
Attaching Velcro to X-LITE®

PREPARATION

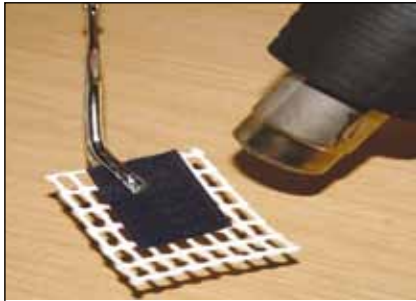
- Left over material of X-LITE® Classic or Premium
- Velcro in appropriate size



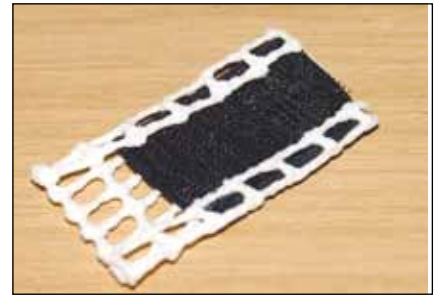
1. Cut out X-LITE® Classic or Premium in appropriate length and width.



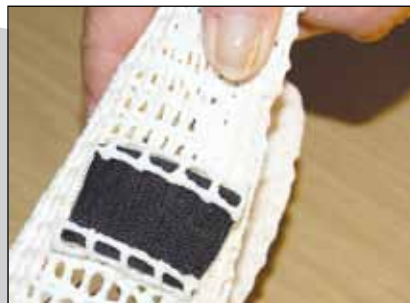
2. There should be enough material to fold around three edges of the Velcro.



3. Use a heat gun (or immerse to water) and fold up the three edges around the Velcro.



5. Heat the back side with a heat gun until sticky.

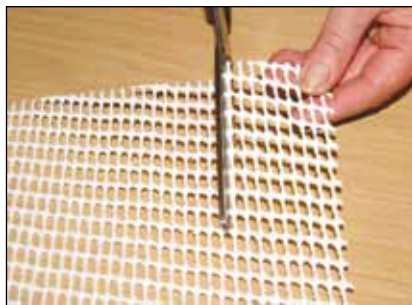


7. Press against the orthosis and let cool.

Attaching Straps - I

PREPARATION

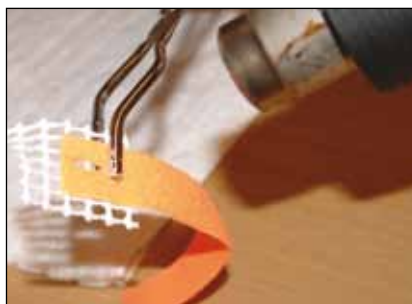
- Left over X-LITE® Classic or Premium material
- Velcro in appropriate size



1. Cut out X-LITE® Classic or Premium in appropriate length and width.



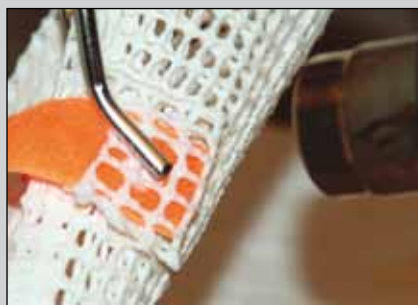
2. Cut a small hole in the Velcro strap to reinforce attachment.



3. Use a heat gun to make the X-LITE® material sticky.



4. Fold the heated X-LITE® material and press firmly together



5. Use a heat gun to get material sticky.



6. Press onto orthosis.

Attaching Straps - 2

PREPARATION

- Velcro strap
- X-LITE® Edging material



1. Cut a hole into the strap material to reinforce attachment.



2. Take a suitable piece of Edging material.



3. Immerse Edging material into water, for a few seconds.



5. Place the strap on the Edging material and fold all the edges around.



6. Use a heat gun to heat up the Edging material and also spot heat onto the orthosis where the strap is to be applied.

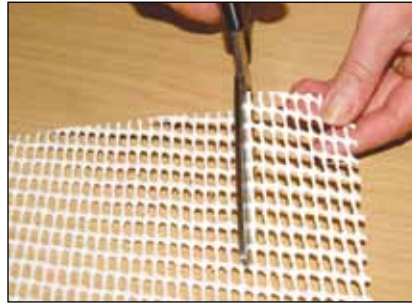


7. Press the strap with the Edging material into the orthosis and let cool.

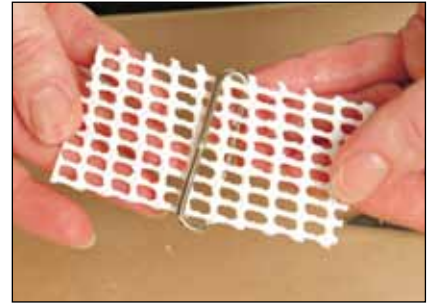
Making Buckles

PREPARATION

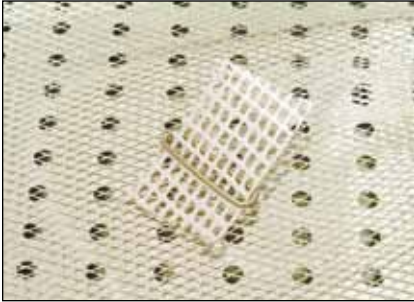
- Left over pieces of material from X-LITE® Classic or Premium
- Buckles in appropriate width



1. Cut out lengths of appropriate width of X-LITE® Classic or Premium material.



2. Put the X-LITE® material through the buckles.



3. Immerse into water until soft.



4. Take out from water and fold.



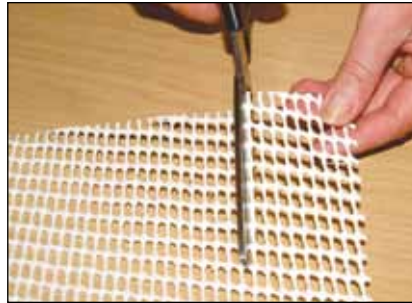
5. Press together. These buckles can be prepared in advance and stored for later use.



Making Posts

PREPARATION

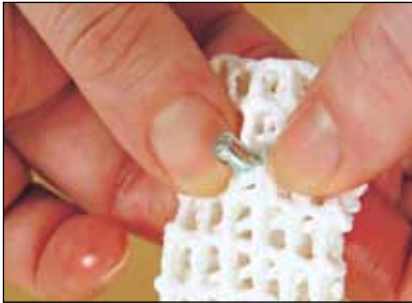
- Left over pieces of X-LITE® Classic or Premium material.
- T-nuts (male and female part)
- Edging material



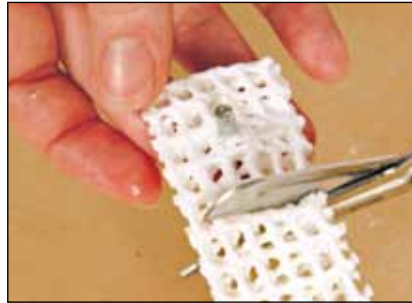
1. Cut out suitable pieces of X-LITE® Classic or Premium material. Use two layers of material, immerse into water and then fold to obtain four layers of material.



2. Press the T-nut through the holes in the material.



3. Make sure it is pressed through all the layers of material. Press firmly.



4. Cut off material to form a square.



5. Take a piece of X-lite Edging material that fits the size of the square.



6. Immerse both parts into water quickly.



7. First remove the X-LITE® with the T-nut from the water and press the material and the T-nut together firmly.



8. Then take the X-LITE® Edging material out from the water.



9. Press the edging material on to the back side of T-nut to make a solid backing.



10. Trim the edges.





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