Standard: Solid Ankle Foot Orthosis

1) Review Work Order
   a. Polymer type and thickness
   b. Design notes – Any special requests
2) Review Mold
   a. Smooth Surface (Any surform marks?)
   b. Trimlines – Present, appropriate, symmetrical
   c. Interior padding requesting
3) Thermoforming Set-up
   a. Place cast of leg in vacuum station, putting the top of the cast as close to vacuum vice as possible. Place anterior side of leg towards floor.
   b. Appropriate Wicking materials for cast
      • Twine – (if needed, typically used for larger adult jobs) staple end to top of cast and wrap around mandrel 1-1.5 times. Staple twine moving distally down the anterior section of the cast staying outside of trims and staple the end of the twine on the distal dorsal portion of the foot.
      • Nylon – stretch the length of nylon over the cast and attach proximally at junction between vacuum and mandrel. Can be knotted or taped with electrical tape. Ensure there are no wrinkles and/or seams inside the trimlines. For smaller jobs, when no rope is used, two layers of nylon are appropriate.
Technical Fabrication Standards

- Aliplast Cap – Use a length of aliplast, (easier if slightly heated in oven) wrap around the junction between the vacuum pipe and cast. Use electrical tape to seal the edge around the vacuum pipe.

4) Plastic Preparation
   a. Cutting Plastic
      - Measure the topographical length of the cast set-up from the aliplast cap down the posterior section of the leg and plantar surface of the foot to approx 1-1.5” proximal to end of toes. This is the length of plastic you should use.

      - Measure the circumference at the widest parts of the cast (At proximal calf and around the ankle). Typically the instep around the ankle is the larger of the two, measure exact circumference; This is the width of the plastic you should use.
Technical Fabrication Standards

- Removing the two distal angles of the plastic to produce a trapezoidal shape can be done to reduce bulk of the plastic. Deburr the rough edges of the plastic with a deburring tool and clean the plastic surfaces of any dirt/debris.

b. Heat plastic in oven as per manufacturers instructions (For Polypropylene - typically, when plastic clears + 5 minutes). Keep a careful eye on the plastic as there may be need to “burp” the plastic if air is caught beneath it.

c. Apply transfer paper ( if requested) when plastic is fully heated.
   - Clip transfer paper to bench (color side out)
   - Spray thin layer of Silicon spray (avoid running or dripping)
   - Fold one end for easy removal.
   - Carefully lay transfer paper on heated plastic and gently rub to fully apply transfer pattern.
   - Grab folded end and remove paper.
   - Ensure quality transfer (no wrinkles/variations in pattern) before continuing.
   - Plastic can be returned to oven to ensure proper surface temperature for thermoforming. (Be cautious to not heat too long so the transfer pattern does not distort.)

5) Drapeforming

a. Remove rolling tray from oven and roll to workstation.
b. Lift Plastic (Help may be needed) and lay plastic on proximal portion of the cast first. Ensure that the plastic is sealed on the aliplast cap.
c. Working Distally, seal the plastic at the anterior portion, around the ankle and toe. Be careful to ensure that the plastic is not too thin and there are no wrinkles.
d. Draw the vacuum. (Note if it takes more than 7 seconds to draw the vacuum or if the plastic has already started to turned opaque – it should be scrapped and re-done).
e. Cut excess plastic near seam to ease removal.
f. Wait for Polymer to cool.
   - Cool for as long as the heating process, and ensure the seam is cool to the touch.
Technical Fabrication Standards

- If there is a liner present with polypropylene or co-polymer, the job needs to be wrapped in thermal blanked and allowed to cool 45-60 min.

6) Finishing
   a. Using Cast saw, following the trimlines, remove thermoformed AFO from cast. Note: Be cautious for Splaying of the formed AFO. If the AFO splays more than 1/8" from the Cast, the job needs to be redone.
b. Use appropriate sanding and buffing materials to smoothly finish the AFO to clinician trimline specifications.

7) Strapping 
   a. Tibial Strap 
      • Select appropriate thickness of tibial strap per Work Order. 
      • Measure the topographical length from 1cm anterior to midline to 1 cm anterior to midline on opposite side. Double this measurement. Cut Dacron strap to this length and sew ½ with hook Velcro and ½ with pile Velcro. Sear hole 1.5 cm from end of pile end for rivet attachment. Attach to the medial side of AFO with 7/16” Speedy Rivet. 
      • Fashion Chafe for Tibial Strap and Rivet to lateral side of AFO (Loop Lateral). 
      • Pad as necessary
Technical Fabrication Standards

b. Ankle Strap

- Select appropriate thickness of ankle strap per Work Order.
- Measure approx 2 cm from the ankle trimline on the medial side to 2 cm past the ankle trimline on the lateral side. Double this measurement. Cut Dacron strap to this length and sew ½ with hook Velcro and ½ with pile Velcro. Sear hole 1.5 cm from end of pile end for rivet attachment. Attach to the medial side of AFO at 45 Deg with speedy Rivet. (Pull towards ankle instep)
- Fashion chafe for Ankle strap and Rivet to lateral side of AFO.
- Pad as necessary

8) Final product

   a. Double check that AFO meets requests of work order.
   b. Fill out Quality Assurance form for device.