TRS Elbow Flexion Control & Cross Bar Strap
"ELF Control Strap"

Please See Attached Assembly Illustrations

Introduction:

The Elbow Flexion Control and Cross Bar Strap (ELF Control Strap) is technology designed to accomplish multiple goals.

1. Allow the prosthetic user to capture and optimize excursion forces created by simple, elbow flexion bio-mechanics in addition to gleno-humeral flexion and bi-lateral scapular abduction bio-mechanics.

Note that the strap is equipped with a cable housing tunnel. This tunnel directs the housing and cable into an arc around the lateral epicondyl. The routing helps magnify elbow flexion forces creating more cable excursion with less effort. Optimal biomechanical benefits will be achieved by locking in the strap's alignment. The strap has a flexible resistance and resiliency that prevents the cable system from contacting the user's tricep or interfering with shirt sleeves. The strap may develop a slight "set" after several days of use. Additionally the ELF Strap provides for a type of cable "rebound" that may enhance control and proprioception. The strap is extra long to facilitate attachment to prostheses with lower socket brim lines.

2. Provide a more reliable, high strength, & weather-proof prosthetic component eliminating the need to fabricate custom cross bar strap systems from scratch using stock, shop leather and webbing materials.

3. Provide a component that can affordably be factored into the existing L Code reimbursement plan for body-powered prostheses that actually saves the facility money by reducing valuable fabrication time and eliminating wear and replacement issues.

Specifications:

Unmodified length: 6.5 in. Max. width: ~.75 in. Thickness at fastener/rivet: .125 in.
Material: High Strength, Flexible Polymer

Installation: General considerations:

System is designed for heavy duty cable housing, using a Teflon® or similar type liner and a HD Cross Bar (Not supplied), a pair of Chicago style (screw together) mounting hardware for attachment is included. *NOTE! Standard size cable using a standard size cross bar can be used but the standard cross bar outside diameter must be enlarged to properly fit into the ELF Strap by using the short sections of clear tubing (Included) to increase the outside diameter. Tubing has an OD equivalent to a HD Cross Bar.*

Standard prosthetic riveting techniques can also be used to mount the ELF Strap, rather than using the Chicago screw type system included.

TRS strongly recommends:

a.. New Prosthesis: Structurally reinforce the brim of the prosthesis to withstand the forces created by the fastening/mounting and ELF Control Strap system. Carbon laminate throughout the socket brim and adequate brim thickness are recommended.

b. Heavy-duty housing should always be lined with a Teflon`® or similar copolymer liner and TRS Cable Housing Ferrules should be utilized to maximize friction free cable movement. Standard Hosmer® cable is acceptable or for greater strength and fray resistance use ***TRS Python Standard*** *diameter stainless cable.*

ELF Control Strap mounting considerations:

1. The ELF Control Strap should be mounted slightly lateral (above) and posterior to the Olecranon so that it generates as much elbow flexion excursion as possible without causing any negative consequences such as external prosthesis rotation. Mounting should harmonize with other cable housing prosthetic hardware attachment locations, ie., the cable housing base plate and retainer or Sure-Lok Cable Control system should be placed in an optimal location within the 90 degree arc between 100% dorsal and 100% lateral positions. This can be terminal device dependent.

SPLIT HOOKS require more pre-positioning and typically require a more dorsal cable housing attachment location to accommodate the movement of the TD. The more dorsal the attachment point the greater the arc created in the housing as it routes to the ELF Control Strap. More arc may result in higher friction.

GRIP Prehensors, ADEPTs and **Lite-Touch Bio-mechanical hands** require a more lateral cable housing attachment in line with the normal "pull" axis of the TD. This cable housing alignment is more direct, "straighter" to the ELF Control Strap and typically more efficient.

2. Position strap so that the cable housing tunnel section of the strap lies proximal to the prosthesis brim (if possible). 3.5 – 4.0 inches of strap typically extends proximal to the brim.

3. Optimal biomechanics are achieved when the ELF Control Strap alignment is "Locked-In" (strap pivoting is reduced or eliminated). This can be achieved in several ways.

a. Two point attachment (Recommended when possible).
b. Extra tight/secure single point attachment.
c. Tight single point attachment combined with modification to prosthesis brim that creates recessed channel that limits ELF Control Strap movement.

Installation:
1. Select optimal ELF Control Strap mounting location. *(See considerations above)*

2. Two point Attachment (New): Drill most distal hole first. This hole may be located 1.5 inches or more from brim. Drill through prosthesis brim. Use a 1/4 inch (.250) diameter drill bit.

Single Point Attachment (New): Drill 1/4 inch d. hole .75 inches – 1.5 from brim (If possible). *Hole should never be closer than .25 inches from brim.*

Existing Prosthesis: Enlarge existing cross bar strap hole to 1/4 inch d. if possible.

3. (All Attachments)
A. Carefully countersink the hole on the inside of the prosthesis to keep the head of the "female component" of the Chicago fastening system flush to the inside surface of the socket for comfort. Fastener head is approximately .440 inches in diameter. Use appropriate counter-bore bit or a Dremel® drill and or rotary grinder with appropriate grinding/cutting bit.

B. Decide on ELF Control Strap length and hole position(s) for mounting purposes. *With two point attachment select distal hole location first.* Cut off strap using band or similar saw and buff edges. Drill hole through strap using 1/4 inch diameter drill bit. Leave a minimum of .250 inches of strap material between the hole and the end of the strap and between the hole and the cable housing tunnel.

C. Test fit. Place FEMALE Chicago fastener component through prosthesis from inside of the socket. Fastener should protrude through brim approximately .09-.10 inches (Less than .125 inches). The issue here is to ensure that the male Chicago fastener component does not bottom out on inner component… you want to have compression of the strap material when system is tightened down. A small, nylon (Included) or similar washer can be sandwiched between male component and strap to absorb fastener length OR IF necessary, grind the female fastener shorter to ensure proper strap compression, as described.

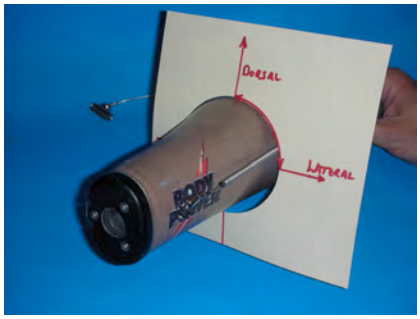
Two Point Attachment: If satisfied with the strap alignment proceed with locating and drilling a second hole through both the strap and prosthesis brim. Do not place any hole closer than .25 inches from brim. Modify the threaded fastener hardware to fit the more proximal hole or plan to use standard, prosthetic, copper rivet system in the proximal location to lock in the alignment.

D. All Attachments.
Prior to securing the ELF Control Strap to the prosthesis.
The cable housing should be threaded into the ELF Control Strap and cross bar assembly before final attachment of the strap to the prosthesis. The cable housing should be slid into and through the tunnel on the distal end of the ELF Control Strap and then threaded into the cross bar that has been positioned in the cross bar tunnel at the proximal end of the strap. *This will be especially important if the prosthesis is equipped with a Sure-Lok system or if the cable housing and base plate are already installed because the cable housing is fixed into these components and cable housing rotation may be inhibited or not possible.*

E. All Attachments. During Final Assembly. Use Blue Loctite® or similar fastener adhesive on threaded Chicago Fastener assemblies to ensure that the components do not loosen during use.

Note: If strap alignment is slightly off (not optimal) after attachment… it is possible to remove one fastener and enlarge the hole carefully in the appropriate direction to allow the strap to shift its angle… then reattach with fastener, using Loctite®, in the new alignment.

Help/Advise: Bob Radocy (bob-trs@att.net) or Tony Asnicar (tony-trs@att.net) 800.279.1865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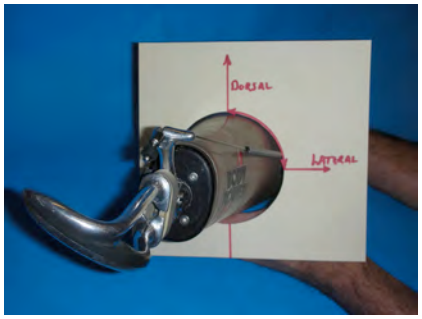
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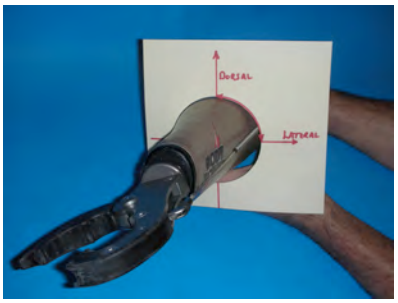
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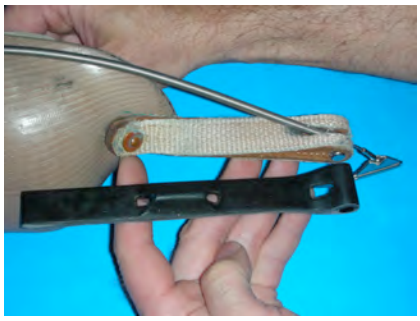

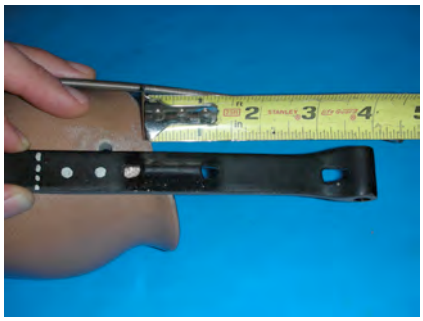

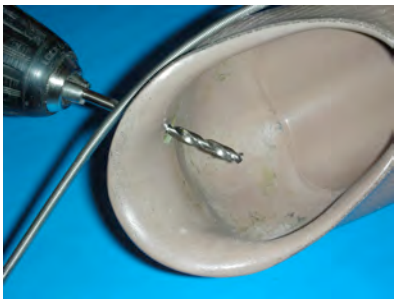

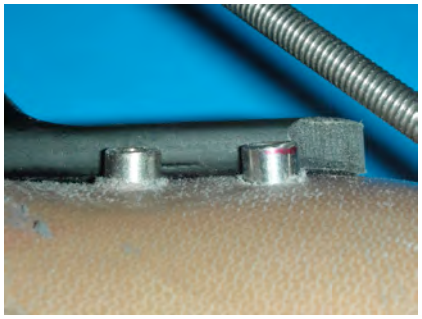

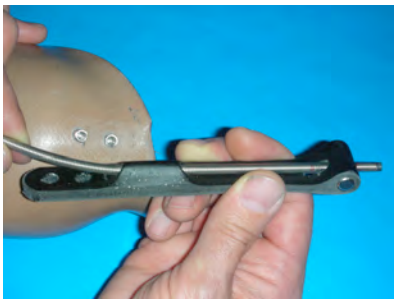

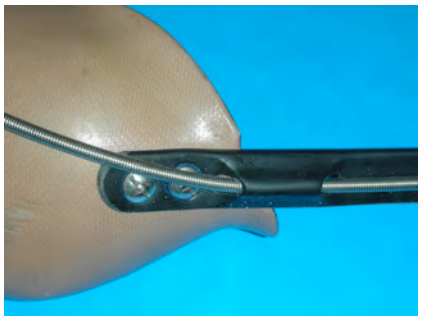

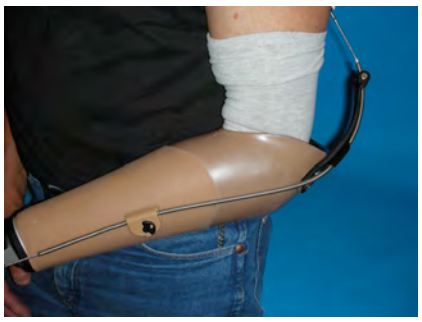

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