“THE IPSILATERAL SCAPULAR CUTANEOUS ANCHOR: IMPLICATIONS IN CONSUMER USE”
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INTRODUCTION
As an occupational therapist, my primary goals are to help clients develop skills to live as independently as possible and to help improve their quality of life. In an effort to achieve these goals for our clients with upper limb deficiency, I invented a new and improved way of harnessing a body-powered prosthesis called the Ipsilateral Scapular Cutaneous Anchor. The design eliminates the harnessing which is often a source of complaint and one reason why users reject prostheses. Traditionally, a body-powered prosthesis is activated by a figure-of-eight or -nine harness system, using the contra-lateral shoulder as the power source. Many users of this system complain of discomfort from the harness rubbing on the skin especially in the axilla and at the O-ring, asymmetry of the shoulders, pain in the contra-lateral shoulder area, difficulty while performing bilateral tasks, and diminished cosmesis. The Ipsilateral Scapular Cutaneous Anchor (the “Anchor”) system derives its primary source of control from the ipsilateral scapula. The “Anchor” requires a tighter fitting socket due to the elimination of the suspension support from the harness. The cable is attached to a plastic patch that adheres to the skin at the scapula. Because the harness is eliminated, the benefits of the system include increased comfort, improved cosmesis and decreased impingement at the axilla. Other benefits include more symmetrical bilateral muscle development, decreased repetitive motion in the contra-lateral shoulder and increased function particularly during bilateral upper extremity tasks. This technology is in patent-pending status with the United States Patent Office. The Anchor has been used in treatment since August 2006. Pediatric patients appear to derive benefit and improved function of their unilateral upper extremity prosthesis with the use of this device.

METHOD
Subjects: To date, 35 subjects; ages 4-21 years with congenital or acquired unilateral trans-radial deficiency, most whom were active users of a body-powered prosthesis, with either a voluntary opening or voluntary closing terminal device have chosen to use the Anchor.

Apparatus: The Anchor system attached to the scapula ipsilateral to the limb deficiency; prosthesis.

Procedures: Each patient is evaluated in a multi-disciplinary clinic. A screening tool and interview are used to identify suitable candidates. Once prescribed by the physician, the prosthettist fabricates a new tighter fitting forearm socket. The prosthettist and the occupational therapist fit the patient with the Anchor. Prosthetic training is provided which includes application, skin hygiene, use and care of the Anchor. Baseline testing is completed which includes the Prosthetic Satisfaction Inventory (PSI) and the Unilateral Below Elbow Test (U-BET), as well as clinical observations using both the traditionally-harnessed prosthesis and the new Anchor activated prosthesis. The patient uses the new prosthesis for three months and then returns for re-testing utilizing the same tools.

Data Analysis: Data has been collected for a retrospective study and includes functional abilities and quality of life measures.

RESULTS
Initial observations and results include ease in application, continued success with prosthetic use, increased use, improved cosmesis and patient satisfaction. Consumer report reflects more “natural” and intuitive movement rather than strategic motor planning required by traditional methods.

DISCUSSION
The Anchor is simple in design and the parts are durable, easily available and affordable. The potential benefits of this system appear to result in increased prosthetic wear and use (tolerance, frequency and spontaneity) as it allows for increased comfort, cosmesis and ease of use during functional activity, particularly during bilateral tasks. Implications for use include a double-button Anchor power system for individuals with trans-humeral deficiency; multi-fastener Anchor to activate a hand prosthesis for those with wrist or trans-carpal deficiency; and to ‘dynamize’ an elbow, wrist or hand orthosis to increase function among individuals with spinal cord, brachial plexus or hemiplegia involvement. It is hoped that future studies will address use of the Anchor in these areas.

CONCLUSION
This device enables individuals with upper extremity limb deficiency to achieve greater levels of functional independence and improved quality of life.

REFERENCES
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Keija, GH, Prosthet Orthot Int 17 (3); 157-63.