INTRODUCTION
While all upper limb amputations are traumatic experiences, levels of self-perceived disability are frequently greater in patients with partial hand amputations than those with unilateral transradial and transhumeral amputations (Phillips 2012). Occupational therapists who specialize in upper limb prosthetic rehabilitation identify a range of challenges that are specific to partial hand prosthetic fitting and training. These include: atrophy of muscles within the residual hand, compromised ergonomics for grasping objects, reduced fine motor manipulation and stereognosis, loss of sensation, hypersensitivity or pain, psychological challenges, and patient expectations of the functional capacity of the prosthesis. There are many variations in patterns of partial hand amputation and there are different prosthetic options depending on the anatomical presentation. Prosthetic options include passive cosmetic restoration, body-powered digits, electrically powered digits, and activity-specific devices. In addition to prosthetic training, it is vital for occupational therapists to educate patients about the potential for overuse on the uninjured side. Over time, some unilateral amputees may be at risk for developing overuse syndrome or cumulative trauma disorder on their uninjured side (Gambrell 2008). Cumulative trauma disorder develops as a result of repetitive use, which ultimately results in micro-trauma of the nerves, muscles or bones (Fletchall 2011). The purpose of this presentation is to illustrate the favorable impact that therapeutic intervention has on the challenges faced by partial hand prosthetic patients, and the subsequent improvement in prosthetic acceptance.

METHOD
Working in conjunction with upper limb prosthetists, occupational therapists designed comprehensive rehabilitation plans for three partial hand patients. Informed consent was obtained from all subjects prior to participation. Subjects: Patient 1 presented with unilateral traumatic partial hand amputation involving the loss of two digits and the partial amputation of a third digit. Patient 2 presented with bilateral traumatic partial hand amputations involving the loss of one digit and the partial amputation of six digits. Patient 3 presented with unilateral traumatic amputation of the thumb. Procedures: An initial pre-fitting evaluation of each patient addressed the range of challenges that are specific to partial hand prosthetic fitting and training. An in-depth assessment of psychological challenges was also conducted, along with a discussion of the various factors involved in acceptance of a prosthesis. By developing an understanding of the patient’s unique needs and strengths, prosthetic options were presented that could allow for increased independence and quality of life. Therapeutic strategies were implemented in conjunction with and throughout the prosthetic fitting process. Finally, a post-fitting interview and questionnaire helped determine shifts in each patient’s functional ability and perspective.

RESULTS
The clinical outcomes of these three patients highlight a range of therapeutic interventions that improved functional independence in everyday activities. Patient 1 was fitted with i-limb digits that enabled him to return to work, help care for a baby and perform activities of daily living more independently. Patient 2 was fitted with i-limb digits on the left side and body-powered fingers on the right side, allowing her increased independence in daily activities. Patient 3 was fitted with a mechanical thumb that restored grasp patterns for bimanual tasks and holding objects. For all cases, some improvements were noted in addressing psychological challenges, preventing overuse of the uninjured hand, and improving patient acceptance of the prosthesis.

DISCUSSION AND CONCLUSION
Partial hand amputations present unique challenges for the prosthetic rehabilitation team. These three cases indicate that comprehensive therapeutic strategies can increase independence, address psychological obstacles, and improve rates of prosthetic acceptance.

CLINICAL APPLICATIONS
The combination of specialized prosthetic care and occupational therapy offers a variety of effective clinical applications for people with partial hand amputations, and reduces overuse injuries to the sound side of the body.

REFERENCES
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American Academy of Orthotists & Prosthetists
40th Academy Annual Meeting & Scientific Symposium
February 26 - March 1, 2014

FPTh14