

A ONE YEAR RETROSPECTIVE OVERVIEW OF PARTIAL HAND PATIENTS USING PRODIGITS

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ABSTRACT

To date, more than 150 patients worldwide, with partial hand amputations, have been fit with ProDigits technology. This study includes a comprehensive overview of 14 of those patients. A major emphasis will be placed upon individuals with partial hand loss due to congenital limb deficiency versus traumatic/disease partial hand loss, and individuals with unilateral and bilateral partial hand amputations. Four different domains are included in this study that represent how these 14 individuals perceive their "Improved Self Image," "Increased Independence," "Positive Change in Lifestyle" and "Increased Activity and Participation in Daily Life." In order to adequately measure these parameters, an overview of a Client Centered Care System (3CS) assessment will be demonstrated, as it presents a new evidence-based tool for upper limb amputee outcomes measurement.

INTRODUCTION

It is stated by Hill et al in "Upper Limb Prosthetic Outcome Measures (ULPOM) : A Working Group and Their Findings," that advances in the design, control, application and provision of upper limb prostheses in recent years has required a more objective justification for the costs involved in providing these services. This has intensified interest in objective measures of performance and use of artificial arms. (1) Without a more unified approach to define what constitutes true "success" in upper limb prosthetic utilization, we cannot effectively communicate between professions, rehabilitation centers and countries. As technology advances the methods of measuring outcomes and patient success must also advance.

A State of the Science Conference (SSC), to address this need, was convened in Chicago, Illinois, in March 2009. The goals of the meeting were to examine the body of scientific knowledge that related to outcome measures in upper limb prosthetics and to examine the following: validated instruments to measure upper limb prosthetic outcomes, what do these instruments measure as it relates to the International Classification of Functioning, Disability and Health (ICF)/World Health Organization (WHO) classifications, strengths and weaknesses of current

instruments, appropriate tools for various applications and primary future research priorities.(2)

After examining this extensive body of knowledge from the SSC, a Client Centered Care System (3CS) was developed by Diane Atkins, OTR, Karl Lindborg, CPO, and a research team including an independent MD and 3 PhD researchers from the Matrix Health Center, LLC. This project began in January 2010 and it continues to be a work-in-progress. A primary goal of this research was to create a comprehensive, multi-disciplinary patient care process that was client-oriented and optimized positive outcomes. Accurately assessing the client's needs and establishing realistic expectations that align the capabilities of the client with those of the device, and experience occupational therapy training with the device, are keys to maximizing the retention rate. Client management begins with a "Candidate Review process" and is designed to flow seamlessly throughout the continuum of care in order to optimize outcomes and client satisfaction. The Continuous Quality Improvement (CQI) of the 3CS process is designed to help ensure effective, efficient and timely ongoing feedback to optimize the entire system. This, in turn, provides additional support to maximize patient success, and thus improve the retention rate.

An additional major goal of this effort was to create a series of assessment tools that gathered data as it related to the important parameters of function (device performance and client satisfaction with the device), independence, general health, activity level, pain, overuse syndromes, occupation, leisure/recreation, social adjustment, self-image, goal setting, motivation, resiliency and quality of life (QoL).

This Client Centered Care System assessment scoring, interpretation and analysis is designed for clinical use and further studies in order to support the facilitation of improved outcomes and optimize patient/client satisfaction.

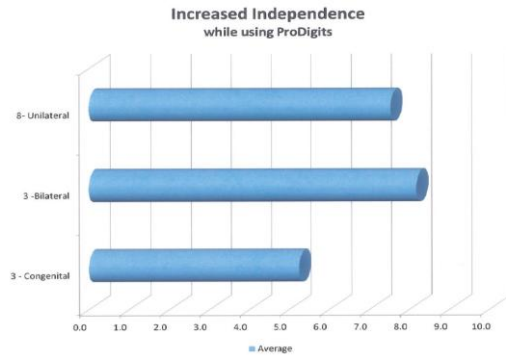
METHOD

A series of assessment tools were administered to 14 individuals, with partial hand loss, at the time of their initial evaluation and at various follow-up intervals. The minimum amount of time that an individual was wearing a ProDigits prosthesis for this study was 3 months.

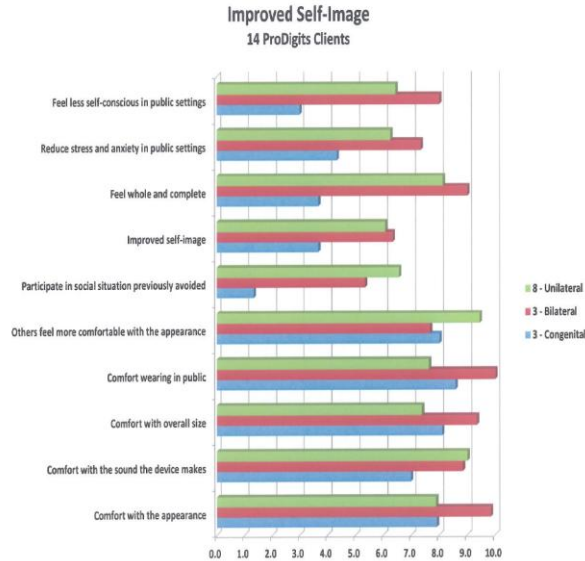
For the purposes of this preliminary study, and of this limited number of ProDigits users, focus was placed upon a 6 page Follow-up Assessment instrument, with over 100 data points, that captured numerous domains. The emphasis of this paper will focus upon 4 areas and the perceptions of the ProDigits users as it related to: "Improved Self-Image", "Increased Independence", "Positive Change in Lifestyle" and "Increased Activity and Participation in Daily Life."

RESULTS

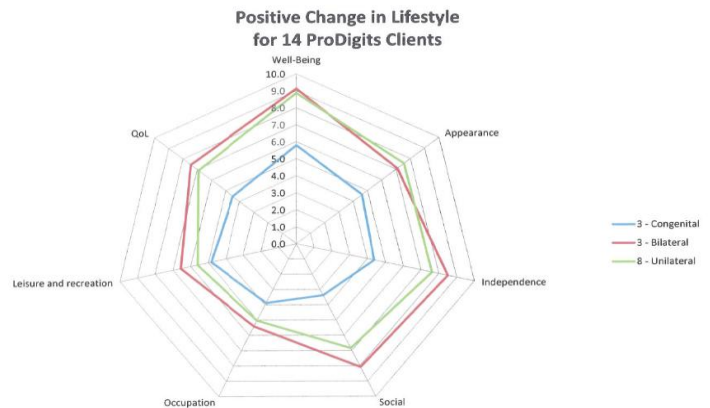
The following 4 graphs demonstrate some of the findings of this comprehensive Follow-up Assessment tool as it relates to 8 Unilateral ProDigits users, 3 Bilateral ProDigits users and 3 Unilateral Congenital ProDigits users (who were viewed separate and apart from the individuals who had sustained traumatic partial hand loss).



The 3 individuals with bilateral partial hand loss expressed the highest level of perceived "increased independence" (8.9/10), when compared to the 8 individuals with unilateral partial hand loss (7.2/10). The 3 individuals with unilateral congenital limb absence felt that ProDigits increased their independence at a level of 5.0/10.

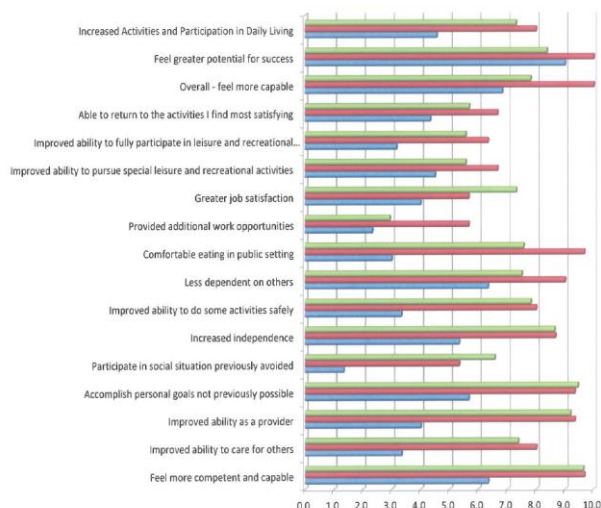


This assessment yields the most dramatic results for the 3 individuals with bilateral partial hand loss. This was the most obvious in the areas of "comfort wearing in public" (9.8/10) and "comfort with the appearance" (9.6/10). Those with unilateral partial hand loss expressed the most positive response as it related to "others feel more comfortable with the appearance" (9.3/10). The 3 individuals with unilateral congenital partial hand absence expressed the highest response in "comfort wearing in public" (8.5/10).



This "spider web" chart demonstrates the parameters of well-being, appearance, independence, social, occupation, leisure and recreation, as well as quality of life measures. It is apparent that individuals with bilateral and unilateral partial hand absence feel a greater degree of "positive change" as it relates to the aforementioned domains, when compared to those with unilateral congenital limb absence. The area of greatest improvement, as it relates to a "Positive Change in Lifestyle" was in "well-being" with a 9.2/10 overall score for the 3 individuals with bilateral partial hand loss, 9.0/10 for individuals with unilateral partial hand loss, and 5.8/10 for those with congenital partial hand absence.

Increased Activity and Participation in Daily Life
14 ProDigits Clients



Individuals with bilateral partial hand loss were favorably impacted in the following areas: “Increased activities and participation in daily living,” “Overall—feel more capable,” “Improved ability to fully participate in leisure and recreational activities,” “Comfortable eating in public settings” and “Improved ability as provider.” Individuals with unilateral partial hand loss expressed the most significant improvements in; “Greater job satisfaction” and “Accomplish goals not previously possible.” Those with congenital limb absence felt improved capabilities, but not to the degree as those with unilateral and bilateral limb loss. The one area where individuals with congenital limb absence clearly felt an improvement was in “Feel greater potential for success” (8.9/10).

DISCUSSION

The results generated from these analyses are enlightening and informative. The 3 distinctions of the groups studied, Congenital, Unilateral and Bilateral enables the clinician to better visualize the unique differences between those who have been born without part of their hand and those who have lost part of their hand secondary to traumatic injury or disease. The individual who is born without part of their hand experiences life in an entirely different manner. In their responses, all of these individuals viewed themselves at “baseline” as completely independent. They simply learned from childhood to accomplish tasks in a different manner. It is interesting to note that in spite of their perceived independence prior to receiving ProDigits, they indeed see benefits and value in ProDigits as it related to “increased independence” and “improved self-image”.

The eleven individuals who had lost part of one or both hands in traumatic injury, or disease, had similar objective responses particularly in the areas of “overall well-being”

and “independence.” These reactions were verified in the many subjective responses expressing; “It gave me back my confidence in a way that I can live going forward,” “I can now shake hands, as I did before, with people looking at me, and not part of my hand.” The final chart validates all of these findings, and more, in a comprehensive manner. Those with congenital limb absence found value and benefit with ProDigits particularly as it related to “Feeling greater potential for success” and “Overall feeling more capable.” Those with bilateral partial hand loss were impacted most by ProDigits as it related to “Increased activity and participation in life.”

CONCLUDING REMARKS

This analysis serves as merely an initial “snapshot view” of the many “arenas” of interpretation an assessment tool such as this provides. While this data is interesting and informative, it is extremely preliminary as it only includes 14 individuals with partial hand loss. Additional research, using a larger number of subjects, will provide supportive information for the trends that this study illustrates.

Much of this information is of no surprise to experienced clinicians in this field. This is a “first” however, to validate these findings, and confirm our beliefs, in an evidence-based manner, as it relates to the person with partial hand loss.

The intent of the researchers involved with this project, and this assessment tool, is to continue to test, refine and define this evidence-based, client-centered care system (3CS). As new prosthetic components become available, we want to explore opportunities to utilize these instruments for comparative studies with other upper limb prosthetic devices. Our goals include continuing to document patient data in an objective manner at base line, exit from training, and scheduled follow-up intervals in order to; measure patient results in a comprehensive and quantitative manner, measure patient care process, and improve the prosthetic device itself as objective feedback is provided.

REFERENCES

- [1] W. Hill, P. Kyberd, L. Hermansson, S. Hubbard, O. Stavadahl, S. Swanson, “Upper Limb Prosthetic Outcome Measures (ULPOM): A Working Group and Their findings.” *Proceedings: Upper Limb Prosthetic Outcome Measures, Official Findings of the State of the Science Conference*, 2009; 9:69-82.
- [2] L. Miller and S. Swanson, “Summary and recommendations of the Academy’s State of the Science Conference on Upper Limb Prosthetic Outcome Measures,” *J Prosthet Orthot* 2009; 21:83-89.