

The Krukenberg Procedure in the Pediatric Patient: A Case Series

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Background

The loss of a hand has devastating consequences on one's functional independence, and reconstruction after hand amputation is limited. The Krukenberg operation, separating the radius and ulna through the interosseous membrane to the level of the pronator teres, provides patients with hand absence a useful and sensate pincer mechanism that is helpful for activities of daily living. Historically, this procedure has been reserved for blind bilateral amputee patients or in areas where prosthetic devices are unavailable. In this series, we present the long-term follow up of pediatric patients who have undergone the Krukenberg procedure.

Methods

We performed a retrospective chart review of patients who underwent the Krukenberg procedure at a single institution. Patient demographic, pre-operative, operative and post-operative data were examined.

Results

From 1987 to 2013, we identified 7 consecutive pediatric patients who underwent the Krukenberg procedure. Indications for surgery included congenital transverse limb deficiency (n=4) and traumatic amputation (n=3). The average age at the time of surgery was 6.6 years, and Average follow up was 4.67 years (range: 2 to 11 years, 9 months) and all patients (n=7) were male. None of the patients were blind. Complications included skin breakdown (n=2) and heterotopic ossification (n=1) which all required reoperation. Overall, the patients did well and used the Krukenberg to perform activities of daily living such as eating, tying their shoelaces, opening bottles, and for dressing. Despite being given the choice of a cosmetic or functional prosthetic to cover the Krukenberg arm, zero patients chose to use a prosthetic.

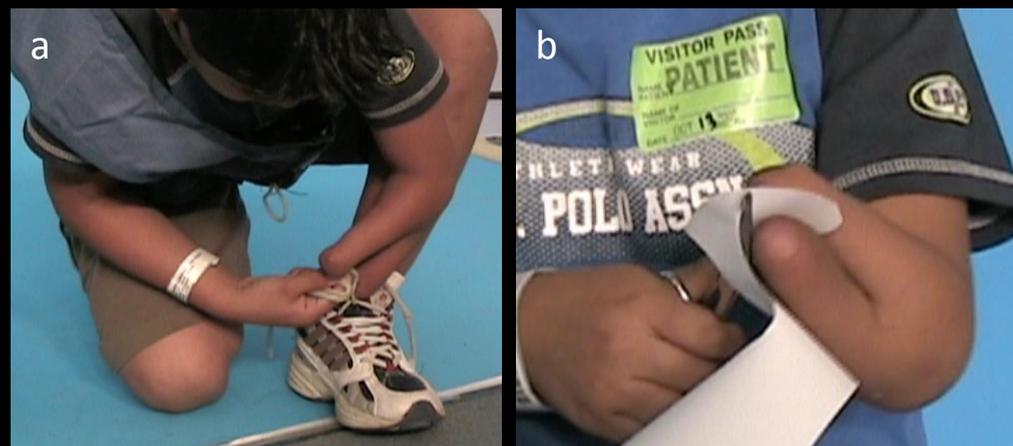


Figure 1. 8 year old right hand dominant male, born with a congenital transcarpal limb deficiency shown 4 years after surgery tying his shoelaces (a) and cutting paper (b).

Conclusion

In this series, we demonstrate the feasibility and safety of performing the Krukenberg procedure in pediatric patients. In certain populations where there are limited resources for prostheses, this procedure offers the patient functional independence with a sensate upper extremity capable of prehension.

