Psychosocial Outcomes in Children with Lower Limb Amputation vs Limb Salvage Tara Wright, MSOP, CPO/L; Gillette Children's Specialty Healthcare; tarajwright@gillettechildrens.com Creation Date: March 2022; Date for Reassessment: March 2027

Clinical Question: Do psychosocial outcomes differ between children who undergo a lower extremity amputation versus limb salvage surgery?

Background: Lower limb deformities in the pediatric population are due to a variety of etiologies, including congenital malformation, infection, trauma, and tumor.¹ Depending on the extent of the deformity, parents may be faced with the difficult decision of choosing between limb salvage or amputation as definitive treatment for their child. Goals of surgical treatment should include restoring mechanical axes of the limb and optimizing function²⁻³ while minimizing pain. Surgical techniques for the treatment of pediatric limb deformity continue to evolve⁴, but the psychosocial effect of these procedures is not well understood.¹ The purpose of this CAT is to evaluate the current literature examining psychosocial outcomes in pediatric patients with lower limb salvage versus amputation. Psychosocial outcomes included in this review refer to those related to psychological or social aspects of the child and may include such aspects as behavior, emotional state, self-concept, social adjustment, or school performance.

Search Strategy:

Databases Searched: PubMed, CINAHL, oandp.org, Google Scholar, Science Direct

Search Terms: "amputation" AND ("limb salvage" OR "limb-sparing" OR "reconstruction") AND ("psychosocial" OR "psych*") AND ("child*" OR "pediatric")

Inclusion Criteria: English, published within the past 10 years, original research, peer-reviewed, participants 19 years or younger, lower extremity amputation and limb salvage

Exclusion Criteria: Systematic review, case study, upper extremity, facial injury/amputation, genital injury/amputation

Synthesis of Results: Three articles were identified relating to psychosocial outcomes in children ages 5-19 years old after limb salvage and amputation⁵⁻⁷. A variety of etiologies were represented: osteosarcoma, fibular hemimelia, tibial pseudarthrosis, and other congenital conditions. Acquired amputations secondary to trauma, infection, and vascular insufficiency were largely unrepresented. Birch et al⁵ and Dabaghi et al⁶ compared psychosocial outcomes after amputation versus limb salvage or failed limb salvage. Birch et al⁵ used a non-randomized, prospective study design and found no statistically significant differences in physical function, psychosocial function, or satisfaction between amputation and limb salvage groups for children with fibular hemimelia. Dabaghi et al⁶ completed a non-randomized, retrospective chart review and found that participants with failed limb salvage resulting in late amputation had increased pain frequency, lower global function, and decreased perception of independence compared to the primary amputation group. In a retrospective chart review, Allen et al⁷ evaluated patients with osteosarcoma with amputation or limb salvage as a single cohort and found that patients who were older at the time of surgery and/or receptive to psychological interventions had a shorter duration of pharmacological pain treatment.

Clinical Message: The current literature regarding psychosocial outcomes in limb salvage vs amputation is limited and widely varied. Reported results differ so it cannot be stated whether there is or is not a difference between these groups. However, there is some evidence to suggest that psychosocial considerations should not be the defining factor for families deciding between primary amputation or limb salvage for their child with congenital lower extremity deformity. Additional data is needed to see if results are similar across other etiologies. The current studies indicate a need to further examine the risk of post-operative complications such as failure of the surgical treatment and chronic pain, which may correlate with psychosocial outcomes in this population. Clinicians may also want to consider a team approach with psychology professionals to monitor children who undergo late amputation after failed limb salvage to monitor for adverse psychosocial reactions.

References:

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Evidence Table

	Birch, 2019 ⁵	Dabaghi, 2015 ⁶	Allen, 2021 ⁷
Population	42 children ≥5 years of age with severe fibular hemimelia (Achterman-Kalamchi Type II; Paley Type III) and surgical treatment ≥2 years prior to date of enrollment	59 pediatric unilateral transtibial amputees who had amputations performed at the Shriners Hospital for Children in Mexico City between 1991-2008	29 children (7-19 years old) with osteosarcoma treated with limb salvage or amputation
Study Design	Prospective non-randomized comparative study	Retrospective non-randomized chart review	Retrospective chart review
Intervention	Syme or Boyd amputation	Primary amputation	Psychological interventions for chronic post-op pain
Comparison	At least one limb lengthening using the SUPERankle procedure	Multiple reconstructive procedures prior to amputation	No comparison, all participants received intervention
Methodology	Parents and participants completed psychosocial questionnaires, participants underwent instrumented gait analysis and completed timed dash	Outcome measures were completed post-op at the study subjects' most recent follow-up visit	Pain ratings, use of pain medication derived from charts. Contents of notes from pain-related psychology visits were coded for non- pharmacological treatments and compliance
Outcomes	PedsQL, PedsQL Version 4.0 Generic Core Scale, PPT-VAS, Piers- Harris 2, BASC-2, CAPP-PSI (amputation group), LLSQ (lengthening group), SADS, kinetic & kinematic data, dash time	PODCI (measures functional outcome and satisfaction), TAPES (psychosocial measure)	Duration of time treated with pain medication
Key Findings	Authors were unable to find statistically significant differences in psychosocial adjustment, physical functioning, or satisfaction between the amputation and lengthening groups	Subjects with failed reconstructions had increased pain frequency (PODCI Pain subscale), lower global function (PODCI Global Function subscale), and decreased perception of independence (TAPES Adjustment to Limitation subscale). The other PODCI and TAPES subscales and satisfaction had no significant differences	Duration of treatment with pain medications was significantly longer in participants resistant to psychological interventions. Older age and/or receptiveness to psychological interventions were associated with a shorter duration of treatment with pain medications
Study Limitations	There were significant differences between the groups for parent education and income; high number of males in the amputation group and females in lengthening group	The age of participants at the time of amputation and/or data collection is unclear; other demographic data, such as biological sex, was not provided. Retrospective design	Retrospective design and small sample size. Psychological interventions were not standardized and there is a possibility of inconsistent documentation in chart notes