

1 Versus 2 Tendon Transfer in Treatment of Brachial Plexus Birth Palsy



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INTRODUCTION

Tendon transfers (TT) are a common procedure utilized for brachial plexus birth palsy (BPBP) patients to improve shoulder function, specifically abduction and external rotation.

The traditional use of two tendons in C5-7 patients may result in loss of midline function. Therefore, we assessed the outcomes of transferring a single tendon (1TT) versus the traditional method (2TT) for patients with C5-7 injuries.

METHODS

- Retrospective review
- 4 year period
- C5-C7 Injuries that underwent tendon transfers to improve external rotation
- Outcomes assessed utilizing the Modified Mallet and ROM
 - 6th category of hand to belly



RESULTS

Basic Demographics

	1-TT*	2-TT	
Total N	11	11	
Male	6	6	
Female	5	5	
Age at operation (Years)	3.6 (1-5.4)	4.1 (2.1-12.7)	P=0.60
Time lapse to post-operative follow-up documentation	22.6 (7.5-38.5)	22.46 (1.2-47.7)	P=0.98

RESULTS

Modified Mallet and Shoulder Range of Motion **Pre-operative 1 vs 2 Tendon Transfer**

	Shoulder Abduction	External Rotation	Internal Rotation	Hand to Neck	Hand to Spine	Hand to Mouth	Sum	Shoulder abduction ROM
1 Tendon	3.27	2.18	3.55	2.00	2.00	2.33	15.22	96
2 Tendon	3.18	2.09	3.82	2.00	2.00	2.00	15.09	85
Difference	0.09	0.09	-0.27	0.00	0.00	0.33	0.13	11
P - Value	0.63	0.56	0.19	1.00	1.00	0.13	0.76	0.40

Both groups have similar external and internal rotation function

Modified Mallet and Shoulder Range of Motion **Pre vs Post Operative 1 Tendon Transfer**

	Shoulder Abduction	External Rotation	Internal Rotation	Hand to Neck	Hand to Spine	Hand to Mouth	Sum	Shoulder Abduction ROM
Pre	3.27	2.18	3.55	2.00	2.00	2.33	15.22	96
Post	3.73	3.64	2.73	2.36	2.00	2.64	17.09	122
Difference	+0.45	+1.45	-0.82	+0.36	0.00	+0.3	+1.87	+26
P-Value	0.034	<0.005	<0.005	0.053	1.0	0.25	<0.05	0.09

The categories of shoulder abduction, external rotation, and sum were statistically significantly better, while internal rotation was worse

Modified Mallet and Shoulder Range of Motion **Pre vs Post Operative 1 Tendon Transfer**

	Shoulder Abduction	External Rotation	Internal Rotation	Hand to Neck	Hand to Spine	Hand to Mouth	Sum	Shoulder Abduction ROM
Pre	3.27	2.18	3.55	2.00	2.00	2.33	15.22	96
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The categories of shoulder abduction, external rotation, and sum were statistically significantly better, while internal rotation was worse

Modified Mallet and Shoulder Range of Motion **Average Change between Pre and Post-Operative**

	Shoulder Abduction	External Rotation	Internal Rotation	Hand to Neck	Hand to Spine	Hand to Mouth	Sum	Shoulder Abduction ROM
1 Tendon	+0.45	+1.45	-0.82	+0.36	0.00	+0.3	+1.87	+26
2 Tendon	+0.55	+1.55	-1.18	+0.45	0.00	+1.1	+2.18	+26
Difference	0.10	0.10	0.36	0.09	0.00	0.8	0.31	0
P-Value	0.69	0.80	0.27	0.86	1.00	0.51	0.35	0.99

There was no statistically significant difference in scores for any of the MM categories or shoulder abduction range of motion

	Not Testable	Grade I	Grade II	Grade III	Grade IV	Grade V
Global Abduction	Not Testable	No function	<30°	30° to 90°	>90°	Normal
Global External Rotation	Not Testable	No function	<0°	0° to 20°	>20°	Normal
Hand to neck	Not Testable	No function	Not possible	Difficult	Easy	Normal
Hand to spine	Not Testable	No function	Not possible	S1	T12	Normal
Hand to mouth	Not Testable	No function	Marked trumpet sign	Partial trumpet sign	<40° of abduction	Normal
Internal rotation	Not Testable	No function	Cannot Touch	Can touch with wrist flexion	Palm on belly No wrist flexion	Normal

CONCLUSIONS

• 1TT and 2TT procedures result in substantial gains in upper extremity function for patients as measured by the MM score

- Specifically → global abduction and external rotation subcategories
- Cost → significant loss in internal rotation for both groups

• 1TT and 2TT procedures have similar outcomes → Consider performing 1TT surgery in C5-7 patients if they have poor midline function preoperatively