

PROPOSAL FOR A NEW STRATEGY IN TETRAPLEGIA SURGERY: COMBINED TENDON TRANSFERS AND NEUROTIZATIONS

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INTRODUCTION

Aim of our strategy for each group of the International Classification:

- Improve functions with nerve transfers
- Combine nerve transfers and tendon transfers
- Include surgery for elbow extension
- Select correct neurotization to avoid the loss of classic tendon transfers (if nerve transfers are not working)

GROUP 0		
Primary Procedure	Positive outcome?	Secondary Procedure
Teres minor to triceps nerve transfer	NO	Posterior deltoid to triceps tendon transfer
Brachialis to ECRL nerve transfer	YES	Flexor pollicis longus tenodesis + Moberg key pinch procedure

GROUP 1 (BR→ M 4)		
Primary Procedure	Positive outcome?	Secondary Procedure
Teres minor to triceps nerve transfer	NO	Posterior deltoid to triceps tendon transfer
Brachialis to AIN/FDS nerve transfer	YES	Extensor digitorum communis tenodesis + Extensor pollicis longus tenodesis
	NO	Flexor pollicis longus tenodesis + Moberg key pinch procedure
BR to ECRB tendon transfer		

GROUP 2 (ERCL→ M 4)		
Primary Procedure	Positive outcome?	Secondary Procedure
Teres minor to triceps nerve transfer	NO	Posterior deltoid to triceps tendon transfer
Supinator to PIN nerve transfer	NO	Extensor digitorum communis tenodesis + Extensor pollicis longus tenodesis
Brachialis to AIN/FDS nerve transfer	YES	BR to opposition
	NO	BR to FPL tendon transfer

GROUP 3 (ECRB→ M 4)		
Primary Procedure	Positive outcome?	Secondary Procedure
Teres minor to triceps nerve transfer	NO	Posterior deltoid to triceps tendon transfer
Supinator to PIN nerve transfer	NO	Extensor digitorum communis tenodesis + Extensor pollicis longus tenodesis
Brachialis to AIN/FDS nerve transfer	YES	BR to opposition
	NO	BR to FPL tendon transfer + Tenodesis FDP 2° to FDP 3°-4°-5°
ECRL to FDP (3°-4°-5° finger) tendon transfer		

GROUP 4 (PT→ M 4) and GROUP 5 (FRC→ M 4)		
Primary Procedure	Positive outcome?	Secondary Procedure
Supinator to PIN nerve transfer	NO	Extensor digitorum communis tenodesis + Extensor pollicis longus tenodesis
Brachialis to AIN/FDS nerve transfer	YES	BR to opposition
	NO	BR to FPL tendon transfer + Tenodesis FDP 2° to FDP 3°-4°-5°
ECRL to FDP (3°-4°-5° finger) tendon transfer		

GROUP 6 (EDC→ M 4)		
Primary Procedure	Positive outcome?	Secondary Procedure
EPL tenodesis		
Brachialis to AIN/FDS nerve transfer	YES	BR to opposition
	NO	BR to FPL tendon transfer + Tenodesis FDP 2° to FDP 3°-4°-5°
ECRL to FDP (3°-4°-5° finger) tendon transfer		

GROUP 7 (EPL→ M 4)		
Primary Procedure	Positive outcome?	Secondary Procedure
Brachialis to AIN/FDS nerve transfer	YES	EDM to APB or EIP to APB
	NO	BR to FPL tendon transfer + Tenodesis FDP 2° to FDP 3°-4°-5° + EDM to APB or EIP to APB
ECRL to FDP (3°-4°-5° finger) tendon transfer		

GROUP 8 (partial finger flexion)		
Primary Procedure	Positive outcome?	Secondary Procedure
ECRB to AIN nerve transfer	YES	EPI/EDM to opposition
	NO	BR to FPL tendon transfer + Tenodesis FDP 2° to FDP 3°-4°-5° + EPI/EDM to opposition

GROUP 9 (Intrinsic deficit)		
Primary Procedure		
Intrinsic reconstruction (Zancolli lasso /House intrinsic procedure)		
Opponensplasty		

CONCLUSION

- Although the utility of nerve transfers in tetraplegia has yet to be fully determined early results show promise.
- The addition of nerve transfers to the skill set of the hand surgeon has the potential to expand the number of functions that can be reconstructed, especially if they are combined with tendon transfers