

See discussions, stats, and author profiles for this publication at: <https://www.researchgate.net/publication/349944406>

Effectiveness of structured motor retraining program in adults with traumatic brachial plexus injury under gone nerve transfer–A case report

Poster · April 2021

CITATIONS

0

READS

28

4 authors, including:



Subin Solomen

Governmental Medical College, Kottayam

58 PUBLICATIONS 49 CITATIONS

[SEE PROFILE](#)

Some of the authors of this publication are also working on these related projects:



Project

orthopedic physiotherapy [View project](#)



Project

electrotherapy [View project](#)



under gone nerve transfer - A case report

Subin Solomen MPT⁺, Jimshad T U MPT*, Dr Sreejith K MD PMR*, Dr Pradeep MCh**

*Government Medical College Kerala ** Elite Hospital Kerala, India

Introduction

Nerve transfer and free flap muscle transfer are the reliable restorative options for the avulsed brachial plexus injuries.

There is limited evidence assessing the efficacy of physiotherapy after multiple motor nerve transfer of pan brachial plexus injury of avulsed type.

Objective: To illustrate the techniques used to improve motor recovery of a subject who had undergone multiple nerve transfer with pan brachial plexus injury

Participant

A 22 year-old male who had right pan brachial plexus injury three year ago.

All muscles in right shoulder were in grade zero prior to surgery.

Undergone following multiple nerve transfer ; Spinal accessory nerve to suprascapular nerve

Phrenic nerve to posterior division of lower trunk

Contralateral C7 spinal nerve to musculocutaneous nerve and to lower trunk

Outcome

Improvement in shoulder, elbow and wrist muscles strength and ROM were followed up for three years EMG for re-innervation

The authors declare no conflict of interest, Funding was not applicable. Informed consent was taken from subject.

Structured motor training

After 6 weeks of immobilisation, passive movements to the operated side, electrical stimulation (Technomed model :Electrostim-DT) and induction exercises were given for the particular donor nerves followed by modified Donor Activated Focused Rehabilitation Approach (Kahn 2016).

Induction exercises:

Spinal accessory nerve (2 exercises): shoulder shrugging, shoulder retraction (30 times hourly*10 times)

Phrenic nerve activation (4 exercises): spirometer and inspiratory muscle trainer (Philips) (6 times each *every waking hour), climbing upstairs, climbing uphill

Contralateral C7 activation (6 exercises) : opposite elbow extension, extension of flexed arm against resistance, horizontal adduction, adduction from 90 degree abduction all with a closed fist. Speedy flexion extension of wrist, pronation and supination

Stages	Donor Activated Focused Rehabilitation Approach (modified)
1	Donor muscle strengthening + Recipient muscle PROM
2	Donor muscle strengthening + Recipient muscle AAROM movements
3	Donor muscle strengthening + Recipient muscle AROM
4	Donor muscle strengthening + Recipient muscle Resisted exercises
5	Isolated recipient muscle AROM
6	Recipient muscle resisted exercises
7	Functional training

Figure 1-6:

- 1 & 2 Shoulder flex & abd
- 3 & 4 Elbow flex & ext
- 5 & 6 Finger ext & flex



Figure 7

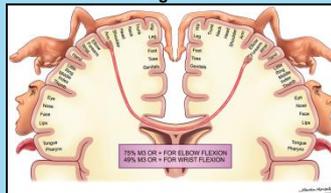
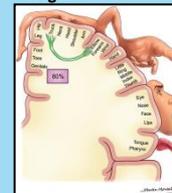


Figure 8



Courtesy: Socolovsky M et al, 2014 Retrieved from <https://thejns.org/focus/view/journals/neurosurg-focus/42/3/article-pE13.xml> published with permission

Results: Stages achieved in months

Group	Stages achieved in months			
	II	III	V	VI
Shoulder Flex/Abd	2	6	9	12
Elbow: Flex	6	11	18	24
Elbow: Ext	5	8	12	15
Wrist: Flex	12	15	20	X
Finger: Flex	15	18	24	X
Wrist/Finger: Ext	24	X	X	X

X= still following up (see figure 1-6)

Discussion and conclusion

Even though same C7 spinal nerve was transferred to elbow, wrist and finger flexors, a unique action of donor muscle action was required to recruit the recipient elbow, wrist and finger flexors.

Training program establishes new motor patterns, fosters cortical reorganisation and promotes earlier recovery than expected.

Central connections between recipient motor area and donor motor area are activated by peripheral nerve transfers, which thereby induce plastic changes in the cortex. (Figure 7 & 8)

Structured program training delivers successful rehabilitation outcomes on post nerve transfers at an earlier than expected.

This recommendation also enhances the intercommunication between Surgeons, Physiatrists and Physiotherapists in improving patients' recovery at an earlier than expected duration.

References

Kahn LC, Moore AM. Donor Activation Focused Rehabilitation Approach: Maximizing Outcomes After Nerve Transfers. Hand Clin. 2016 May; 32(2):263-77.