Somsak nerve transfer

This surgery involves transferring fascicles from a functioning Radial nerve to the Axillary nerve. The fascicles that innervate one of the triceps are usually used. The aim of surgery is to re-innervate the Deltoid muscle to allow shoulder elevation above shoulder height and to perform light lifting. This movement will initially be instigated by a coupled movement of elbow extension and shoulder elevation (or shoulder extension if the posterior deltoid is innervated first).

**Please note:** This procedure involves a direct nerve repair very close to the muscle. It may take up to 9 months to see a flicker of activity within the deltoid muscle. With any nerve transfer surgery activation of the intended muscle is variable and often unique to the individual patient. Consequently, a definitive timescale of recovery is not possible to predict. This protocol therefore follows a phased format; whereby a patient is to be progressed to the next level once they reach the relevant milestone. Common complications and their suggested management strategies are outlined below.

This is a guideline of rehabilitation for physiotherapists; any limitations and restrictions recorded in the patients’ operation note should take precedence. These guidelines should be used in conjunction with your assessment of the patient. Your treatment should be clinically reasoned and adapted to the individual patient’s needs. Time frames are approximate; progress as clinically indicated, only moving onto the next phase once the patient can comfortably achieve phase appropriate exercises and tasks, unless the operation note specifies otherwise. The exercises offer ideas rather than being a prescription.

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<table>
<thead>
<tr>
<th>Possible complications:</th>
<th>Symptoms:</th>
<th>Action:</th>
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<tbody>
<tr>
<td>Neuropathic pain</td>
<td>Pain felt in the arm, forearm or hand; burning, stinging or shooting in nature.</td>
<td>Ensure regular analgesia is being taken (Paracetamol) to distinguish between post operative pain. Contact RNOH CNS, surgical team +/- GP.</td>
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<tr>
<td>Numbness in the arm or hand</td>
<td>Tingling or lack of feeling in the arm or hand which is not painful.</td>
<td>Discuss with RNOH surgical team +/- therapy team at next routine appointment</td>
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<tr>
<td>Failure to progress through phases</td>
<td>Lack of palpable or visible deltoid muscle contraction at 6 months post op. Failure to increase strength of deltoid despite strengthening programme. Poor motivation to continue with rehabilitation.</td>
<td>Discuss with RNOH surgical team +/- therapy team at next routine appointment. Ensure that patient has an understanding of the slow nature of recovery in order to keep their motivation to rehabilitate.</td>
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<tr>
<td>Co-contraction</td>
<td>Activation of both agonist and antagonist muscle groups (e.g. Latissimus Dorsi and Pecs) preventing movement through range. Abnormal movement patterning (excessive shoulder hitching).</td>
<td>Discuss with RNOH surgical team +/- therapy team at next routine appointment</td>
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<tr>
<td>Scar adhesions/tethering</td>
<td>Tight cord or band of scar tissue. Overgrowth of scar beyond normal boundaries. Skin adhered to deeper layers of tissue noticeable of palpation of scar site.</td>
<td>Reinforce scar massage and ensure good technique. Consider other treatment modalities such as silicone gels. Discuss with RNOH therapy team if needed.</td>
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### Phase 1: PROTECTION
**Milestone:** 0-6 weeks

**Advice**
- Lancaster sling 6/52.
- Strip wash with the use of Collar and Cuff and use wipe for axilla hygiene.
- Scar management can begin at 2/52 after wound check.
- Neuropathic pain relief as appropriate.
- Encourage good posture.
- Keep as active as possible e.g. walking, recumbent bike.

**Exercises (SHOULD NOT EXACERBATE PAIN)**
- No Gleno-humeral joint movement
- No AROM or PROM of elbow or forearm.
- Maintain AROM and PROM wrist and hand.

### Phase 2: MUSCLE ACTIVATION
**Milestone:** 6 weeks onwards

**Advice**
- Wean off sling – starting in the home. Could try 1 hour on/off. Decrease as comfort allows.
- May consider shoulder subluxation support – such as an “omotrain®”.
- Pace activities throughout day.
- Encourage good posture with an emphasis on normal movement.
- Continue scar management programme.
- May return to work.
- The individual may return to driving when they decide that they are safe to do so. May need DSA assessment.
- If patient showing signs of psychological trauma please consider referral to local psychology/talking therapies team.
- Progress gym activities as appropriate e.g. cross trainer, running, and squats.

**Exercises (SHOULD NOT EXACERBATE PAIN)**
- Start full PROM programme.
- Begin donor muscle activation programme of coupled movement – active elbow extension with (passive) GHJ elevation.
- Integrate HEP into functional activities e.g. placing hand on mouse when using computer or sliding hand along table to reach for objects.
- Strengthen innnovated muscles (if clinically appropriate).
- Once Grade 1 muscle activation seen in cuff consider Electrical stimulation +/- biofeedback to assist muscle activation.
- Consider gravity neutral positions to encourage active GHJ elevation at first signs of re-innervation (e.g. side lying and arm slides into shoulder flexion with hand on carrier bag).
- Consider water based exercises.

### Phase 3: PROGRESS LOADING and NORMAL MOVEMENT
**Milestone:** Grade 3 muscle activation in Biceps

**Advice**
- Integrate arm into normal function.
- Encourage good posture with emphasis on normal movement.
- Ensure that patient specific goals are set and treatments are holistic.
- Continued education regarding timescales of recovery and importance of continuing with rehabilitation programme.

**Exercises**
- Continue to focus on active functional movements such as reaching into cupboard, hand to back of head.
- Begin light resistance exercises as appropriate (related to the patient’s level of muscle activation) can start with sliding hand up banister or wall.
- Attempt to retrain muscle patterning if required.

Therapists who are not experienced in treating patients who have undergone nerve transfer surgery may find the following references useful:
- Sturma et al. (2019) Structured Motor Rehabilitation after selected nerve transfers. Journal of Visualized Experiments e59840
- [https://www.rnoh.nhs.uk/services/rehabilitation-guidelines](https://www.rnoh.nhs.uk/services/rehabilitation-guidelines)

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