

## Stockinette sling: 'A simple method and patient friendly method of immobilisation of elbow and shoulder after a free functioning muscle transfer in global brachial plexus palsy'

Sir,

Free functioning muscle transfers (FFMTs) are mainly used for conditions wherein, there is a major loss of upper limb musculature leading to a functional deficit, which cannot be corrected by simple procedures. These include Volkmann's ischemic paralysis, electrical burns, post-replantation necrosis, long standing nerve injury and muscle excision for tumour.<sup>[1-4]</sup> It is a good reconstructive option for elbow flexion in upper brachial plexus injuries and complete brachial plexus injury.<sup>[5-8]</sup> This procedure is used for secondary reconstruction by us for similar indications.



**Figure 1(a,b):** Ten days post-operative picture of a 22-year-old male operated for global plexus palsy with free functioning muscle transfers (gracilis), who is immobilised with stockinette sling

In case of complete paralysis, we attempt to restore the elbow flexion first by FFMTs and then go ahead with the shoulder reconstruction. Good, proper and patient friendly immobilisation after FFMTs for the elbow and or finger flexors is one of the important steps in post-operative care. Immobilisation after FFMTs is achieved by a plaster cast maintaining the shoulder in adduction and elbow flexion.<sup>[5-8]</sup> We have observed that this type of immobilisation is very cumbersome for the patient and the surgeon during the post-operative period and before the start of physiotherapy. Taking into account surgeon — patient comfort and at the same time maintaining adequate immobilisation, we have devised a sling for patients who are operated with FFMTs in complete brachial plexus palsy. Our sling is a modification of the sling which was used by Gilcrist to immobilise the shoulder.<sup>[9]</sup> This modified sling immobilises elbow in addition to shoulder. The principle behind this modified stockinette sling is that in a global plexus, there cannot be abduction of the shoulder hence only the elbow has to be immobilised in flexion. The sling is made up of stockinette, which is used routinely as a layer inside a plaster. The length of the sling can be measured by keeping the elbow in 130°-135° flexion. The sling is divided into two halves the part in which the hand, proximal forearm enters and the other part, which cuffs around the axilla. The part of the sling near the axilla is cut longitudinally to make space for it. The stockinette above the axilla fits over the shoulder and is then taken round the back of the neck to the opposite side of the neck. The distal end of the stockinette is rolled up until this opening and the hand is slipped through the hole for the axilla, until the roll reaches the axilla and then the stockinette is rolled down over the limb until it opens completely beyond the fingers. This end is then pulled towards the neck to bring the elbow into approximately 130°-135° flexion and is then tied to the proximal end of the stockinette that has come round the neck, to maintain the elbow in flexion this flexion can be adjusted as and when required by tightening the sling or loosening it. The fingers and wrist are immobilised in flexion, by default in this sling [Figure 1a, b].

We have used this sling in our post-operative protocol for all cases of global brachial plexus palsies treated with FFMTs. We have found that both the surgeon and the patient are comfortable with the sling. Immobilisation is maintained adequately. Change of dressings is easy and the sling can be replaced easily, unlike a plaster. It is easy to monitor and inspect the extensive surgical incisions for problems such as haematoma, which are not uncommon

in these cases. When a plaster slab is used, wound inspection is a major problem and if there is a significant oozing from the drains, the plaster becomes messy and change of plaster is a very cumbersome procedure. This sling can be only used in those patients who have no shoulder abduction.

Thus, this new type of immobilisation can be used universally in all patients who are operated with FFMTs with global brachial plexus palsy.

**Bipin A. Gangurde, Mukund R. Thatte,  
Nitin Mokal, Samir Kumta**

Department of Hand, Microsurgery, Plastic Surgery,  
Sushrusha Hospital, Dadar, Mumbai, Maharashtra, India

**Address for correspondence:**

Dr. Samir Kumta, 1, Vikas, Vinaya Society,  
B. Keer Lane, Mahim, Mumbai - 400 016, Maharashtra, India.  
E-mail: Samir.kumta@gmail.com

## REFERENCES

1. Ikuta Y, Kubo T, Tsuge K. Free muscle transplantation by microsurgical technique to treat severe Volkmann's contracture. *Plast Reconstr Surg* 1976;58:407-11.
2. Lin SH, Chuang DC, Hattori Y, Chen HC. Traumatic major muscle loss in the upper extremity: Reconstruction using functioning free muscle transplantation. *J Reconstr Microsurg* 2004;20:227-35.
3. Manktelow RT, McKee NH. Free muscle transplantation to provide active finger flexion. *J Hand Surg Am* 1978;3:416-26.
4. Manktelow RT, Zuker RM, McKee NH. Functioning free muscle transplantation. *J Hand Surg Am* 1984;9A:32-9.
5. Berger A, Hierner R. Free functional gracilis muscle transplantation for reconstruction of active elbow flexion in posttraumatic brachial plexus lesions. *Oper Orthop Traumatol* 2009;21:141-56.
6. Doi K, Sakai K, Fuchigami Y, Kawai S. Reconstruction of irreparable brachial plexus injuries with reinnervated free-muscle transfer: Case report. *J Neurosurg* 1996;85:174-7.
7. Doi K, Sakai K, Kuwata N, Ihara K, Kawai S. Double free-muscle transfer to restore prehension following complete brachial plexus avulsion. *J Hand Surg Am* 1995;20:408-14.
8. Barrie KA, Steinmann SP, Shin AY, Spinner RJ, Bishop AT. Gracilis free muscle transfer for restoration of function after complete brachial plexus avulsion. *Neurosurg Focus* 2004;16:E8.
9. Gilchrist DK. A stockinette-Velpeau for immobilization of the shoulder-girdle. *J Bone Joint Surg Am* 1967;49:750-1.

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